



Southeast Universities Hobby
Planning Study

February 3, 2004

Alternatives Analysis Report

Prepared for:

Metropolitan Transit Authority of Harris County

Prepared by:

Parsons Brinckerhoff Quade & Douglas, Inc.

Contract No.

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METROMOBILITY



Southeast
Universities
Hobby
Planning Study

**METRO Mobility
Southeast-Universities-Hobby
Planning Study**

**ALTERNATIVES ANALYSIS
REPORT**

**Prepared for:
Metropolitan Transit Authority of Harris County
Houston, Texas**

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1. Purpose and Need

1.1 Introduction

The Alternatives Analysis (AA) described in this report is a part of the Federal Transit Administration's (FTA's) process for transit corridor studies, and is a specific element of the Southeast-Universities-Hobby Planning Study. The overall purpose of the Planning Study is to identify appropriate application of the Metropolitan Transit Authority of Harris County (METRO) program to identify and implement the Advanced High Capacity Transit (AHCT) concept appropriate to the corridor under study. AHCT is defined as a corridor transit facility that provides high-capacity, high-speed, two-direction, near all-day transit service. The technology may be any of a variety of vehicle and guideway forms intended to attract greater use of public transportation, improve the level of service of the overall transportation system, contribute to better air quality, and provide ample capacity to meet growing travel demand.

The route(s) to be followed and technologies to be used will be decided through a process that considers alternatives, beginning with a wide variety of ideas and narrowing, through a process of progressively detailed analysis and continual public involvement, to the selection of a "Locally Preferred Investment Strategy" (LPIS). The LPIS, fully integrated with a system-wide plan for the METRO service area, then will be subject to refinement of design concepts and preparation of a Draft Environmental Impact Statement (DEIS).

The intent of the *Purpose and Need Report* statement is to document the rationale for consideration of AHCT, as demonstrated by current and anticipated development and transportation conditions within the study area. By identifying existing or anticipated future transportation deficiencies, it also contributes to the formulation of potential transportation improvements.

The *Purpose and Need Report* addresses the following main topics:

- Definition of the study area;
- Characteristics of the study area including land use, population, employment, and student enrollments at major educational facilities;
- Transportation infrastructure and services; transportation deficiencies and congestion levels;
- Travel characteristics of the study area including travel patterns for trips by all modes, and use of public transportation;
- Goals and objectives; and,
- Public transportation strengths, deficiencies, and opportunities.

1.2 Study Area Setting and Context

1.2.1 Study Area Description

1.2.1.1 Regional Context

The Metropolitan Planning Organization for the greater Houston area is the Houston-Galveston Area Council (H-GAC). This organization maintains plans and policies for the

area's transportation system, air and water resources, economic growth potential, and various social service and human resource needs. H-GAC's responsibilities extend across a 13-county area. Eight of those counties, Harris, Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller comprise the primary area of metropolitan development.

Within that area, the overwhelmingly dominant provider of public transportation services is the Metropolitan Transit Authority of Harris County (METRO), Texas, formed in 1979. This agency, funded by a one-percent sales tax levied within its boundaries, encompasses 1,285 square miles, including most of Harris County and small parts of Fort Bend and Montgomery counties. METRO operates a fleet of 1,500 buses providing local and express, commuter, METROLift, METROVan, Special Events, Charter, and FasTrak services. These services carried approximately 97 million passengers in 2002. METRO has built and now operates more than 100 miles of High Occupancy Vehicle lanes, 14 Transit Centers, and 24 Park & Ride Lots with a total of over 26,000 parking spaces. METRO's newly-built 7.5-mile "Downtown to Reliant Park" light rail line began revenue passenger service early in January 2004. METRO is expanding the HOV system and building additional Transit Centers. Under a "General Mobility" program, METRO has funded extensive street improvements within its service area.

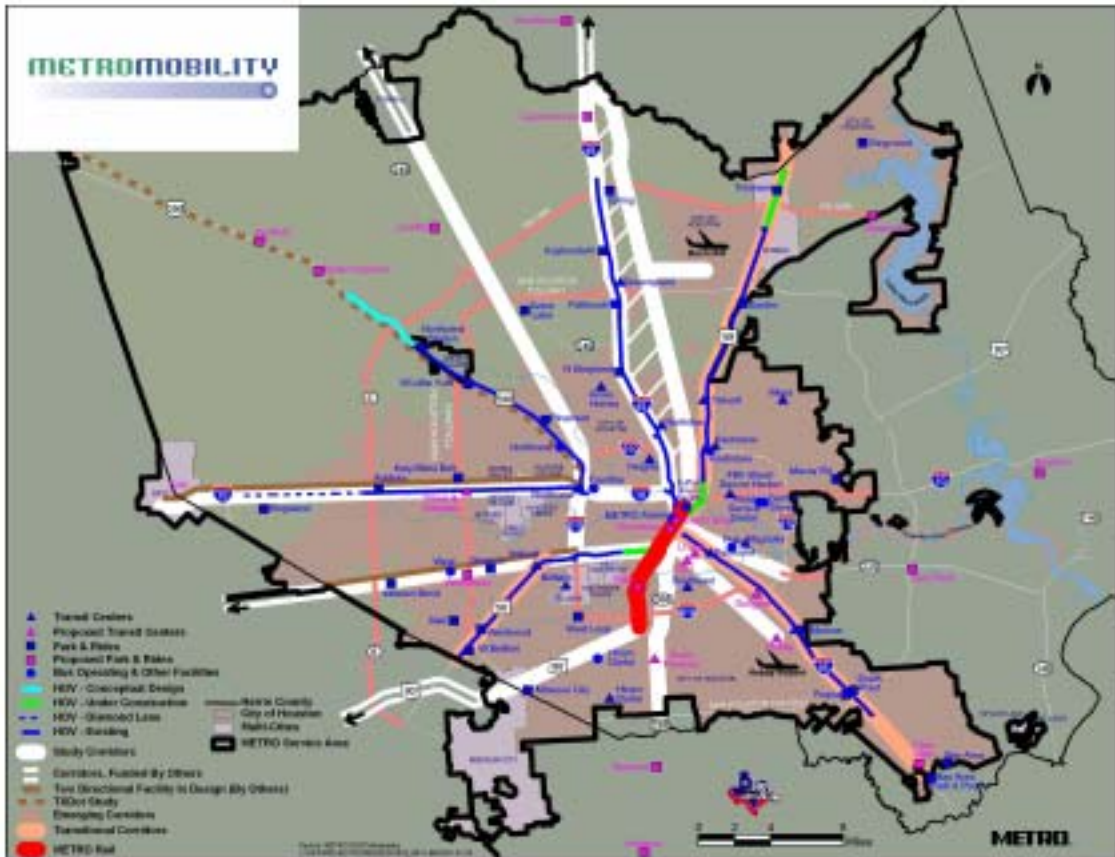
In May 2001 the METRO Board of Directors adopted a "mode-neutral 2025 Transit System Plan for Mobility" (now referred to as the METRO Mobility Plan) and directed the staff to work with H-GAC to incorporate the 2025 Plan into the Metropolitan Transportation Plan (MTP). The Board also selected corridors for more detailed evaluation. Three of those corridors are the subject of planning studies including AA and the preparation of a DEIS. These three studies address the North-Hardy, Uptown-West Loop, and Southeast-Universities-Hobby corridors. In addition, METRO is continuing to develop and refine plans for other corridors that will be the subject of major transit improvements as progress is made in implementation of the long range plan.

The three AA corridors and other corridors as their plans develop must all fit logically together to form a functionally sound and integrated regional system. The choice of transit technology to be used and the specific routing at locations where interfaces with other parts of the regional system occur are key aspects of the planning for AHCT. Equally, the system planning process must recognize and serve the specific needs of each corridor.

The adopted METRO Mobility plan is illustrated in Figure 1-1. Elements of the plan include:

- Bus fleet replacement and expansion;
- Service improvements and expansion;
- New transit centers and park & ride lots;
- HOV extensions and improvements;
- General mobility improvements;
- Downtown to Reliant Park light rail; and,
- Two-directional AHCT in ten corridors (Inner Katy, Outer Katy, WestPark, Harrisburg, SH 288, Tomball, North – Hardy, Southeast – Universities – Hobby, and Uptown – West Loop), and US 90A.

Figure 1-1. The METRO Mobility Plan



Source: METRO, January 2003

1.2.1.2 Corridor Context

The Southeast-Universities-Hobby study area, shown in Figure 1-2, includes downtown Houston, a near-downtown area to the east, and a broad wedge to the southeast, generally bounded by IH 45 on the east, SH 288 on the west, and Almeda Genoa Road on the south.

This corridor and the North-Hardy and Uptown-West Loop corridors have been selected for an assessment of the applicability of AHCT by means of an AA within the METRO Mobility program. In addition, METRO is continuing to develop and refine plans for other corridors that will be the subject of major transit improvements as progress is made in implementing the long range plan.

An important aspect of the planning for each of the three AA corridors, and for other corridors as their plans develop, is that all fit logically together to form a functionally sound and integrated regional system. The choice of transit technology to be used and the specific routing at locations where interfaces with other parts of the regional system occur are both key aspects of the planning for AHCT.

An “equal partner” in the system planning process is to recognize and serve the specific needs of each corridor. Consequently, an understanding of the unique characteristics of the corridor, including the needs and opportunities it affords, is a vital element of the study.

1.2.1.3 Previous Studies in the Corridor

The Southeast-Universities-Hobby Planning Study begins within the context of recent prior studies. These include the long range planning efforts that led to identification of this corridor as one of the AA areas for development of AHCT.

Previous studies also include the Southeast/Universities Corridor Study, which was completed in December 1998. This study addressed general transit improvement needs within the inner portion of the present study area and included identification of potential infrastructure and service improvements. There was no focus, however, on the introduction of new transit technologies and services such as AHCT.

Figure 1-2. The Southeast-Universities-Hobby Study Area



Strategic objectives identified during the course of the study were:

- Comprehensive access to major transit routes;
- Transit access to essential services;
- Improved connections to downtown and Texas Medical Center (TMC);
- Coordination with internal Texas Southern University (TSU) and University of Houston (UH) shuttle routes; and,
- Strategically selected capital improvements and bus stop locations.

The study found that bus route coverage (provision of a bus stop within a quarter-mile of all residents) was virtually complete, but travel within neighborhoods and to or from some of the less prominent trip destinations often required transfers. The study also found that access to major activity centers outside the study area, such as downtown and the TMC, was not uniformly convenient to residents within various parts of the study area. A need was recognized for integration of METRO bus services with UH and TSU internal bus services. There was need for infrastructure projects including improvement of streets on which bus routes operate, bus stop improvements, and projects to provide or improve sidewalks that are needed as pedestrian access routes to bus stops.

1.3 Growth, Development, and Mobility Issues

1.3.1 Metropolitan Area Growth

Current forecasts by the Houston-Galveston Area Council indicate that the population in the eight-county region is expected to grow from approximately 4.6 million in the year 2000 to 6.5 million by 2025. During the same period, regional employment will grow from 2.4 million to 3.1 million. The most rapid growth is occurring in suburban and master planned communities surrounding the city, but the city, Harris County as a whole, and the METRO service area will continue to gain population and employment through both redevelopment and new development of areas that are under-utilized or still vacant. The forecasts are summarized in Table 1-1.

In addition to the activity centers shown, METRO recognizes the airports, the Museum District, Reliant Park and vicinity, and the UH and TSU campuses as a focus of travel within the region. These university campuses are adjacent to one another within the Southeast-Universities-Hobby corridor. Two of the activity centers in the table and four in the additional places listed are within or adjacent to the Southeast-Universities-Hobby corridor. Altogether, activity centers contain nearly half of Harris County's current and future employment.

The current (2000) and future (2025) distributions of population and employment within much of the METRO service area are illustrated in Figure 1-3 through Figure 1-6, which have been drawn from current H-GAC forecasts for the years 2000 and 2025. As evident in the figures, the population distribution in the Southeast-Universities-Hobby area is broadly similar to that found in much of the area, although there are higher concentrations of population seen in the near north side and in large portions of the southwest. Employment is mainly concentrated outside the Southeast-Universities-Hobby area corridor, but the corridor's labor force benefits from the proximity of downtown and the TMC and other nearby employment concentrations. Furthermore, the corridor itself is not far below the areawide average in its ratio of employees to population.

Table 1-1. Employment and Population Forecasts

Activity Center	Employment		Growth Factor, 2025/2000	Household Population		Growth Factor, 2025/2000
	2000	2025		2000	2025	
CBD	156,469	178,602	1.141	1,290	8,227	6.378
Bay Area	44,419	49,664	1.118	50,233	70,035	1.394
Energy Corridor	84,692	99,806	1.178	124,685	152,699	1.225
Greenspoint	73,563	103,042	1.401	94,484	133,034	1.408
Greenway Plaza	80,810	131,473	1.627	14,968	14,612	0.976
Galleria	129,264	154,949	1.199	62,930	59,831	0.951
TMC & Plaza del Oro	89,014	113,267	1.272	34,778	40,607	1.168
Westchase	98,008	106,494	1.087	138,306	163,315	1.181
Subtotal, Activity Centers	756,238	937,299	1.239	521,674	642,360	1.231
Other Harris County	1,189,961	1,529,759	1.286	2,759,426	3,659,350	1.326
Total Harris County	1,946,200	2,467,057	1.268	3,281,100	4,301,710	1.311
Southeast-Universities-Hobby						
Excluding CBD	105,848	124,918	1.180	193,678	215,642	1.113
Other METRO Service Area	1,630,091	2,074,291	1.273	2,572,859	3,415,352	1.327
Total METRO Service Area	1,735,939	2,199,209	1.267	2,766,537	3,630,994	1.312
Outside METRO Service Area	627,354	909,279	1.449	1,764,931	2,763,725	1.566
Total Region (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller)	2,363,293	3,108,488	1.315	4,531,468	6,394,719	1.411

Source: METRO GPC April 12, 2002; H-GAC

The average household income level within the Southeast-Universities-Hobby area is below the average for the eight-county H-GAC area as a whole, and average household size is above average, as shown in Table 1-2, below. Note that income ranges have been set according to areawide quintiles (an equal percentage within each of five categories). The forecasts indicate minimal change in these percentage distributions between the years 2000 and 2025.

Table 1-2. Household Income and Household Size in Year 2000

Annual Income Range	Less than \$15,000	\$15,000 to less than \$25,000	\$25,000 to less than \$35,000	\$35,000 to less than \$50,000	\$50,000 or more
Southeast-Universities-Hobby	39.9%	24.1%	17.3%	12.0%	6.7%
Eight-County Area	20.0%	20.0%	20.0%	20.0%	20.0%
Persons per Household	1	2	3	4	5 or more
Southeast-Universities-Hobby	22.3%	27.7%	18.1%	17.0%	14.9%
Eight-County Area	24.2%	27.8%	17.6%	16.4%	14.1%

Source: H-GAC Travel Demand Forecasting Data (METRO, March 19,2002)

Ethnicity of the population within the Southeast-Universities-Hobby area is described in Table 1-3, below, by Super Neighborhood. The Super Neighborhoods are shown in Figure 1-7. Overall, the population is predominately African-American, but three of the eleven areas in the table, especially the Gulfgate/Riverview Super Neighborhood, have more Hispanic residents than any other ethnic group.

Figure 1-3. Primary METRO Service Area Population Distribution, Year 2000

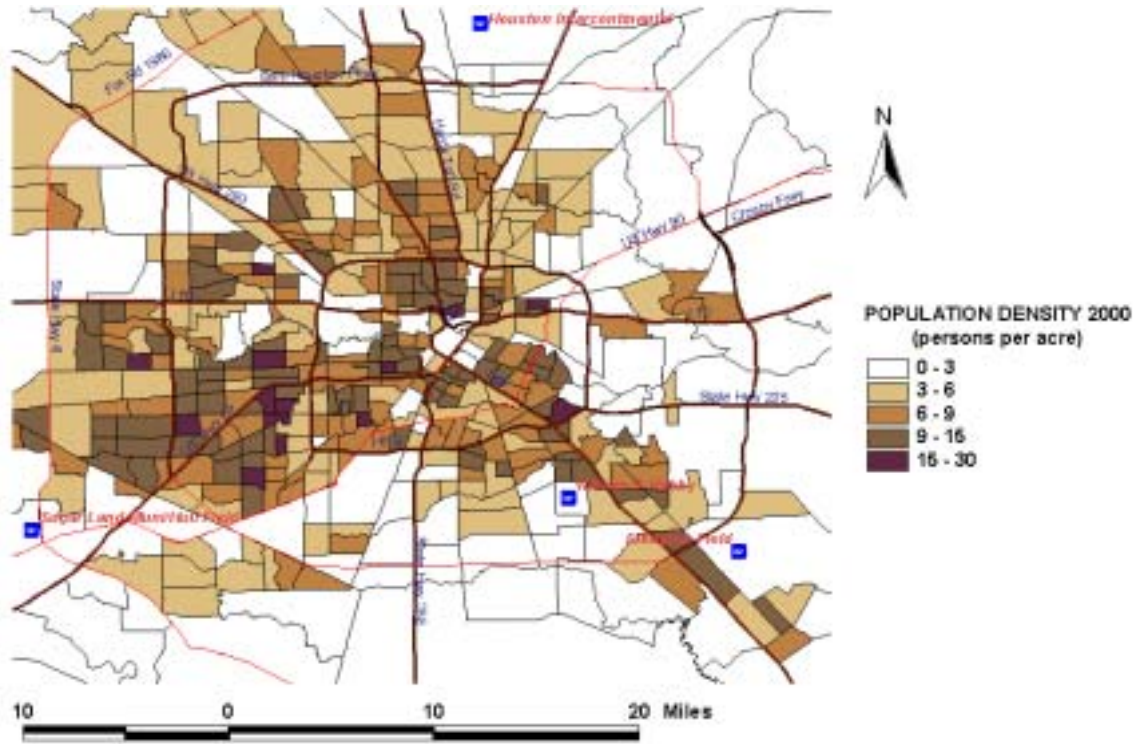


Figure 1-4. Primary METRO Service Area Population Distribution in Year 2025

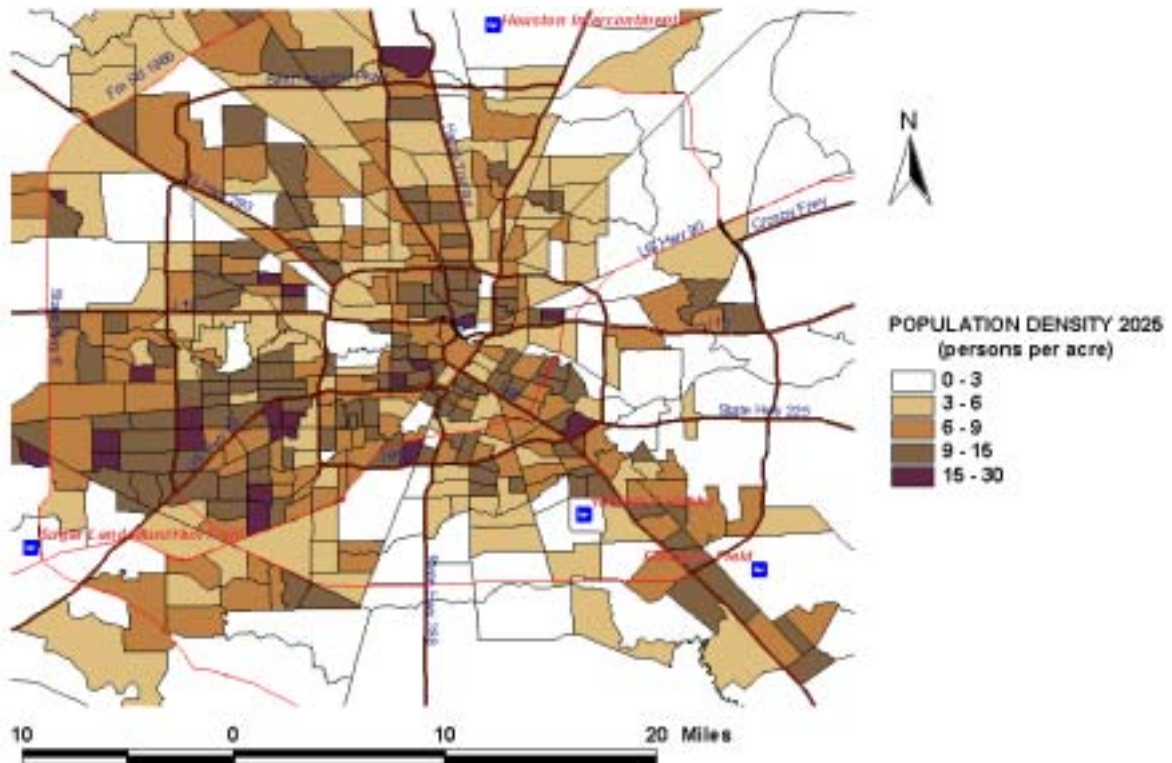


Figure 1-5. Primary METRO Service Area Employment Distribution in Year 2000

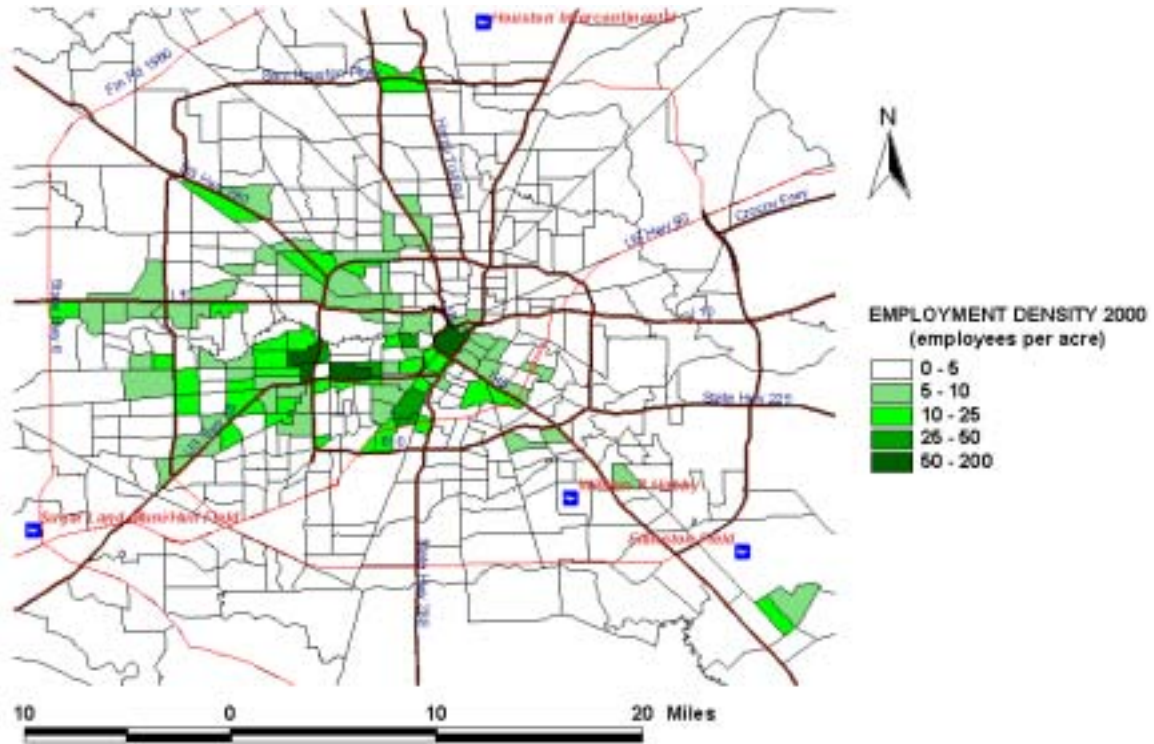


Figure 1-6. Primary METRO Service Area Employment Distribution in Year 2025

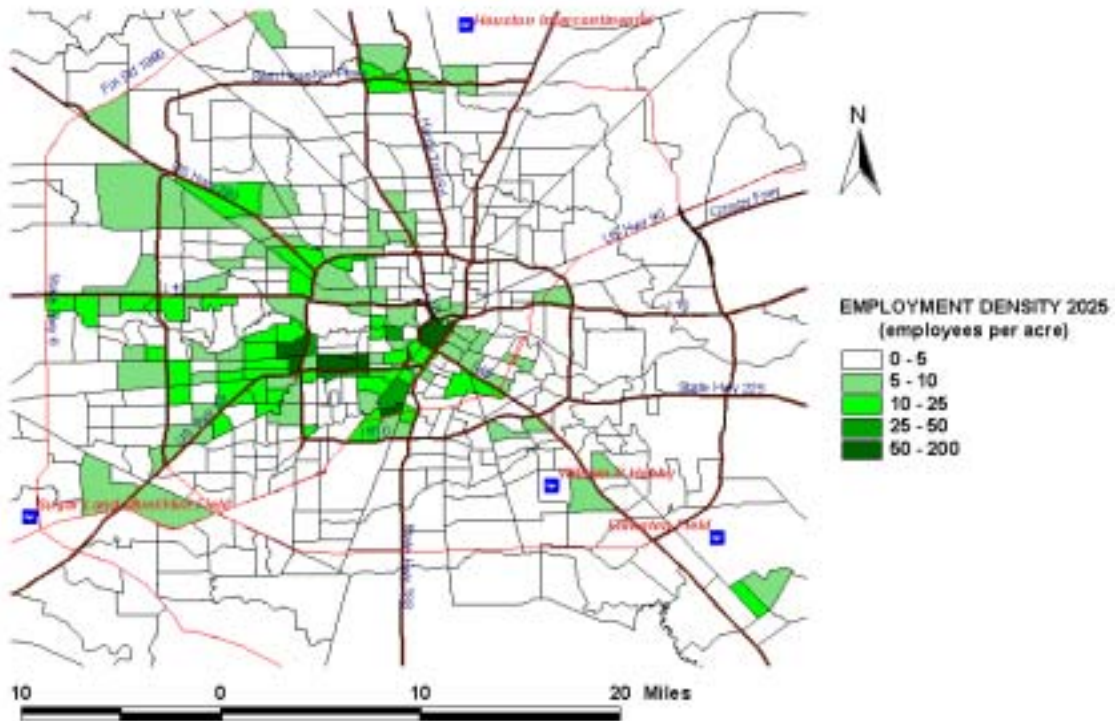
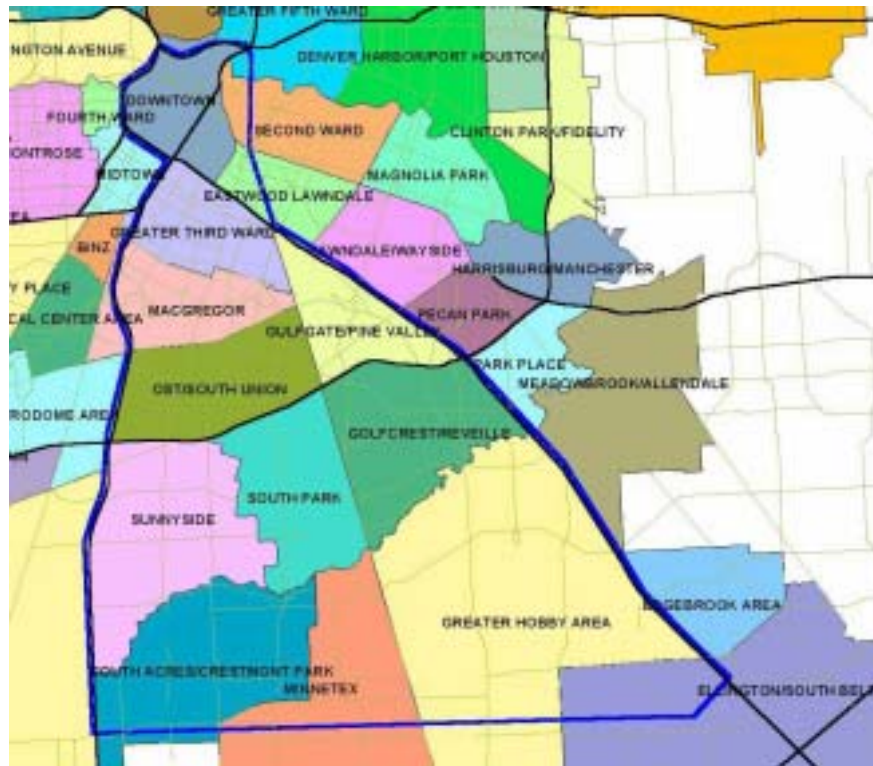


Table 1-3. Ethnicity of the Population (percent of total in each area)

Super Neighborhood	African-American	White	Hispanic	Asian	Other
Downtown	42	26	23	1	9
Greater Third Ward	76	13	7	4	1
MacGregor	73	15	8	4	1
Old Spanish Trail / South Union	86	3	10	<1	<1
Sunnyside	90	3	5	2	<1
South Park	88	4	8	0	0
Gulfgate / Pine Valley	8	8	82	2	<1
South Acres / Crestmont	90	4	5	<1	<1
Golfcrest / Reveille	29	15	54	2	<1
Minnetex	55	22	20	2	<1
Greater Hobby	32	28	36	4	<1

Source: 1997 data, US Department of Housing and Urban Development (from City of Houston)

Figure 1-7. City of Houston Super Neighborhoods in the Southeast-Universities-Hobby Corridor



Source: City of Houston

1.3.2 Corridor Overview: Land Use

The northern end of the corridor lies in the downtown area and land uses are dominated by retail and commercial establishments. Immediately south of the downtown area large public

and public/private investments have been made in: Minutemaid Arena, home of the Houston Astros; an expanded George R. Brown Convention Center; a 1,200-room Convention Center Hotel (Hilton Americas); a 20,000 seat multi-purpose arena; and the expanding retail and restaurant venues to support this complex.

The predominant land use within the Southeast-Universities-Hobby corridor is residential, with substantial areas containing pre-1950 housing, particularly in the Third Ward area, which extends about two miles south and east from the central business district (CBD) to Bray's Bayou. The UH and TSU campuses are within this area. Many of the major arterials throughout the corridor are sites of strip commercial development; there are few major shopping centers, an exception being Gulfgate, just inside the corridor at the intersection of IH 45 and IH 610.

The next major east-west barrier south of Bray's Bayou is formed by IH 610 and the Union Pacific Railroad (UP). These two facilities are nearly parallel to one another, and generally form an arc at a radius of four miles from the southeastern corner of the Houston CBD.

Another active railroad, the Burlington Northern Santa Fe (BNSF), runs the length of the corridor, from the northwestern corner of the CBD southward and slightly eastward. Both railroads serve a variety of industrial sites located along their routes.

Another two and a half miles south of IH 610 and the UP tracks is Sims Bayou, which, like Bray's Bayou, drains from west to east toward Galveston Bay. Another mile to the south is William P. Hobby Airport, occupying a site that is roughly 1.5 miles square.

1.3.3 Corridor Growth

As shown in Table 1-1 and the figures in Section 1.3, the Southeast-Universities-Hobby Corridor, excluding the Houston CBD, is typical of much of the METRO service area. According to existing and projected figures, the area is near average in ratios of employment to population, but not projected to grow as rapidly in either population or employment as the overall METRO service area through 2025. In the year 2000, the Corridor's ratio of employees per capita was 0.547, compared with a ratio for the entire METRO service area of 0.627. The projections for 2025 indicated corresponding ratios of 0.579 and 0.606, respectively. The Corridor, with about four percent of the land area within the METRO service area, in the year 2000 contained 7.0 percent of the service area's population, and 6.1 percent of its employment. These percentages will drop to 5.9 and 5.7 percent, respectively, by 2025.

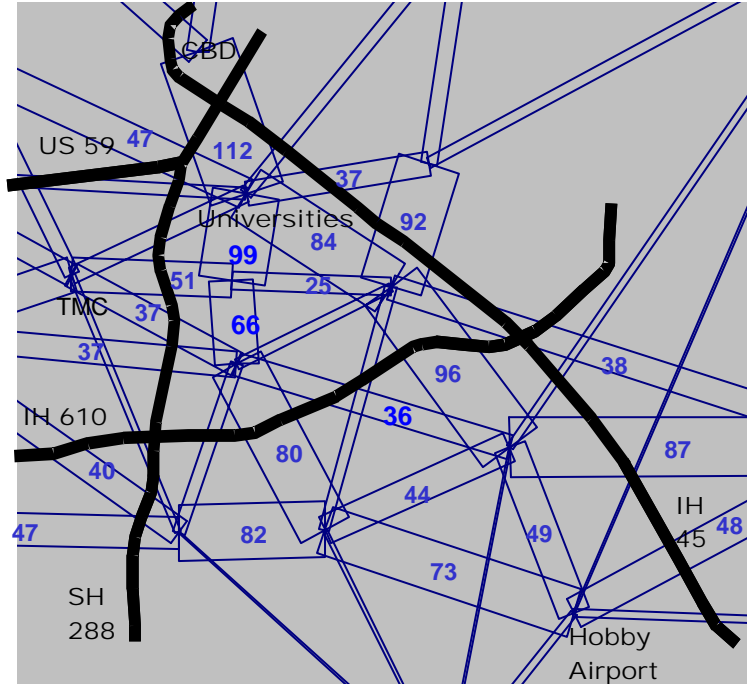
1.3.4 Travel Patterns in Corridor

As noted earlier, the major activity centers within the area, other than the CBD, are the university campuses and Hobby Airport. Lesser concentrations of trips are oriented to commercial locations. Other major regional activity centers, including office, medical services and hospitals, entertainment facilities, and sports venues are located outside the non-CBD portion of the Southeast-Universities-Hobby Corridor. Analysis of travel patterns reveals the prominence of outside-of-corridor trip origins and destinations as part of the picture of travel involving the Corridor. This is illustrated in Figure 1-8. In Figure 1-8, the corridor has been subdivided into eight sectors, four to the north of IH 610, and four to the south.

As shown, there are large north-south travel movements within the Corridor, and within the lower portion of the Corridor, large east-west movements as well. Travel between the Corridor and other parts of the region to the west are significant but dispersed, while there are more concentrated movements to the CBD, to the northeast, and in the lower part of the Corridor, to the east (South Houston and Pasadena, which lie outside the METRO service area). In particular, many of the trips oriented toward the TMC continue to points farther west,

while a large proportion of the trips oriented toward downtown (the Central Business District or [CBD]) go no farther than downtown.

Figure 1-8. Major Person-Trip Flows, Year 2022
Weekday Trips by All Modes, Thousands



Source: METRO and METRO GPC from H-GAC trip distribution model (compressed from METRO 786-zone system)

1.4 Transportation Facilities and Services Related to the Study Area

1.4.1 Existing Roadway Facilities, Level-of-Service and Safety

The Study Area Map (Figure 1-2) shows that the Corridor is served by a comprehensive network of major arterials, supplemented by the freeways (IH 45, IH 610, and SH 288). Together with the local and connector streets, they form an essentially complete road system; there are a few locations where natural and man-made barriers result in missing links that if built might usefully augment the transportation system. Due to the age of the infrastructure and a general lack of maintenance, some facilities suffer from poor pavement conditions.

Parking is in short supply at the university campuses but otherwise ample in most locations within the Corridor.

Projected traffic assignment maps for the years 2007 and 2022 have been examined to gain an understanding of anticipated road capacity issues within the Corridor. Table 1-4 summarizes average volume/capacity ratios of the freeways and arterials during morning and evening peak periods for those two forecast years. Note that Mykawa has much lower traffic in 2022 than in 2007. This change results from the anticipated extension of Highway 35 from a southern terminus at Long, where Mykawa begins, to Beltway 8 and beyond during the intervening years.

Volume/capacity ratios are used to define the Level of Service (LOS) of roadways. Six LOS levels, A (best) through F (worst) are used in traffic engineering practice.

Table 1-4. Average Levels of Service (Volume/Capacity Ratios) on Freeways and Major Arterials within the Southeast-Universities-Hobby Corridor

Freeway/ Major Arterial	Average Volume/Capacity							
	Southbound or East Bound				Northbound or Westbound			
	Morning Peak		Afternoon Peak		Morning Peak		Afternoon Peak	
	2007	2022	2007	2022	2007	2022	2007	2022
IH 45	0.67	0.65	1.40	1.36	1.33	1.32	0.87	0.96
SF 288	0.37	0.42	0.78	0.78	0.80	0.87	0.48	0.49
SH 610	0.77	0.70	1.14	1.05	1.07	1.10	0.91	0.86
HWY 35	0.29	0.31	0.74	0.52	0.85	0.73	0.47	0.41
Scott	0.18	0.20	0.41	0.35	0.36	0.39	0.31	0.27
Cullen	0.19	0.18	0.49	0.40	0.51	0.46	0.31	0.23
MLK	0.18	0.13	0.40	0.21	0.43	0.30	0.26	0.14
OST	0.19	0.18	0.43	0.34	0.47	0.46	0.25	0.22
Griggs	0.25	0.25	0.67	0.53	0.67	0.68	0.35	0.31
Long	0.28	0.30	0.76	0.58	0.91	0.78	0.42	0.38
McGowan	0.28	0.31	0.62	0.66	0.57	0.62	0.48	0.60
Airport	0.36	0.42	0.45	0.48	0.45	0.55	0.42	0.44
Bellfort	0.42	0.43	0.74	0.64	0.75	0.83	0.61	0.55
Dowling	0.39	0.55	0.37	0.41	0.25	0.29	0.40	0.40
Mykawa	0.51	0.15	1.06	0.20	0.91	0.50	0.72	0.17

Source: Summarized from traffic assignments supplied by METRO

Volume/capacity ratios below 0.75 (generally the threshold between Level of Service C and D) are desirable, and ratios above 0.90 (Level of Service E) are definitely problematic, resulting in unstable flow with frequent stoppages and a probability of failure to achieve the normal maximum capacity of a roadway. Volume/capacity ratios greater than 1.00 (Level of Service F) indicate failure to carry the projected demand, which will spill over into a broader peak period if no alternative routes are available. Ratios of 0.75 or greater have been highlighted in Table 1-4.

The traffic assignment results show that the freeways and several arterials fall into these undesirable ranges during at least one peak period and direction. This indicates that traffic performance, especially for longer trips, is problematic and that more attractive public transportation service is clearly desirable to provide a viable alternative to progressive traffic congestion. On the positive side, the moderate volume/capacity ratios on arterials indicate that in a number of locations it may be possible to allocate existing lanes to AHCT without unacceptable effects on traffic levels of service, thus avoiding widening streets and taking additional right of way.

Note that the 2022 demographic forecasts that underlie these forecasts have recently been shown to be well below the actual level of population anticipated to reside in the Houston metropolitan area during that decade. Consequently the travel demand forecasts are at understated levels in these traffic forecasts as well.

1.4.2 Existing Transit Services/Ridership

The Southeast-Universities-Hobby corridor is served by a comprehensive network of local bus routes including two crosstown routes (26/27 on Old Spanish Trail, and 73 on Bellfort) and several circulator routes. In addition there is one commuter express bus route, which connects downtown Houston to Hobby Airport and an area to the southeast including two

Park & Ride facilities, Memorial Hospital East, and San Jacinto College South (outside the designated corridor). These routes provide roughly 19,060 weekday bus revenue miles of service within the corridor. This constitutes nearly 23 percent of all local bus service in the METRO service area. The weekday average revenue service speed is 12.5 miles per hour, which is also the METRO system-wide average speed for local bus service.

The most heavily used bus routes are those on Scott, Cullen, MLK, and Bellfort (52 Scott, 30 Cullen, 77 MLK Ltd, and 73 Bellfort Crosstown). Table 1-5 presents approximate passenger volumes for the routes operating in the corridor, as determined during an on-board passenger survey conducted in 1995. The totals, 60,200 weekday boarding passengers or 49,800 linked passenger trips, are consistent with more recent "ride check" data. The corridor ridership equals 25 percent of METRO's 1995 system-wide local-service boardings and 27 percent of local-service linked passenger trips (237,200 boarding passengers per weekday, and 183,600 linked passenger trips per weekday). In addition, data indicates that passengers in the Southeast-Universities-Hobby corridor have a slightly lower transfer rate than do local bus passengers in the METRO service area as a whole.

Table 1-5. Approximate Bus Ridership in the Southeast-Universities-Hobby Corridor

Route	Boardings	Linked Passenger Trips
5	4,210	3,430
26	6,344	5,054
30	3,687	2,949
35	762	645
36	2,483	2,131
40	4,543	3,694
41	185	127
42	1,782	1,378
50	5,047	4,041
52	6,621	5,599
60	1,129	939
68	4,881	4,169
73	6,824	5,394
77	5,163	4,468
87	1,538	1,151
88	411	340
89	478	409
321	2,860	2,849
Totals	60,183	49,791

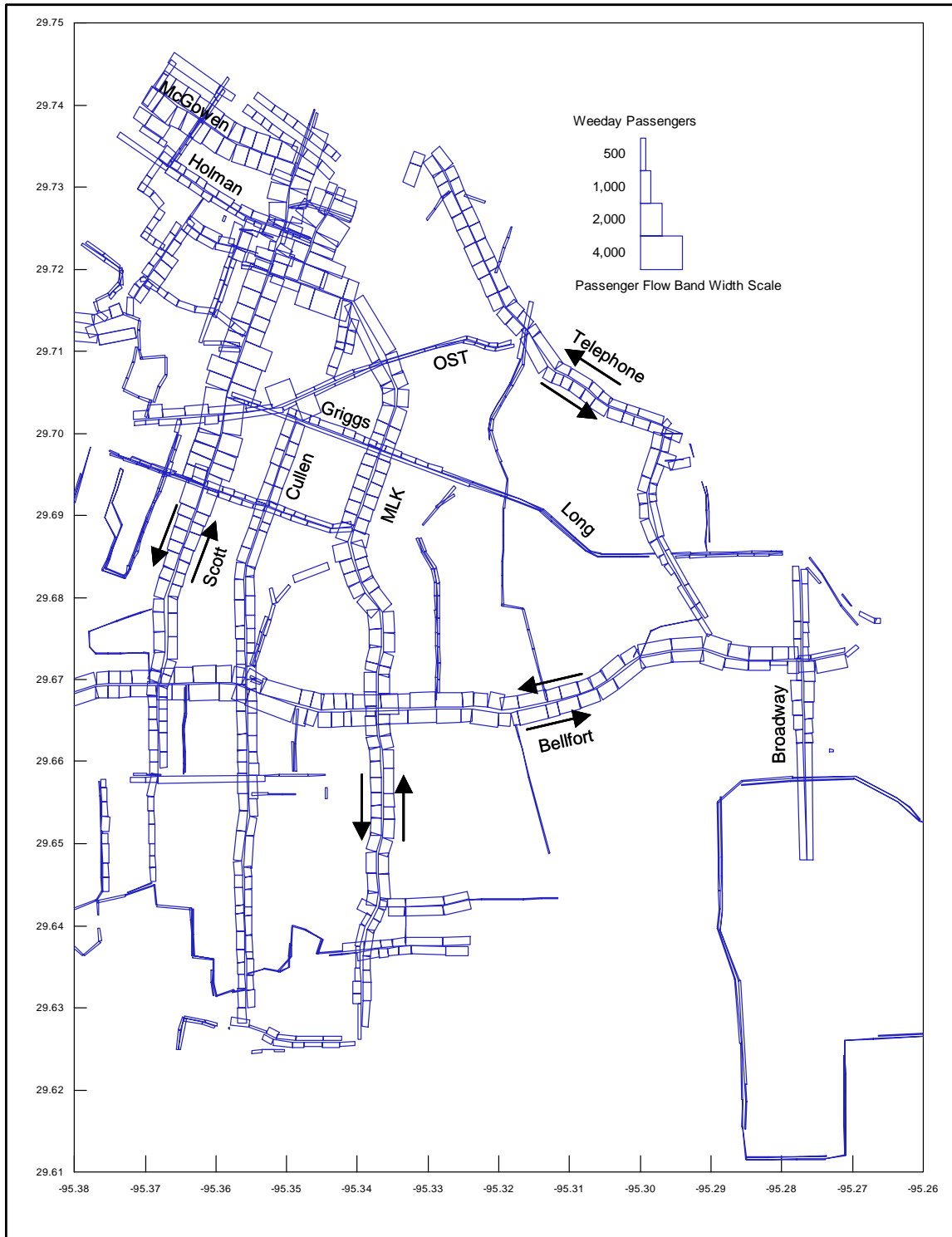
Source: METRO on-board passenger survey, 1995

Available "ride check" data illustrate passenger flows as well as passenger boarding and alighting patterns within the Southeast-Universities-Hobby corridor, as shown in Figure 1-9 and Figure 1-10. The passenger flow diagram shows the concentration of transit passenger travel around the UH and TSU area and to and from downtown Houston. Also in evidence is the importance of the Scott Street corridor. Other corridors that stand out are Bellfort, MLK, Cullen, Broadway, and Telephone Road. The more heavily used portion of the Telephone Road route lies to the north, outside the project's study area.

The boarding and alighting diagram reveals major route-to-route passenger transfer points as well as areas that are important origins and destinations of the passengers. The most prominent transfer points are where the major north-south routes intersect the 73 Bellfort Crosstown route. Beginning at its eastern end, this route follows Broadway from Hobby Airport to Bellfort, travels the length of Bellfort to SH 288, and continues westward and to the

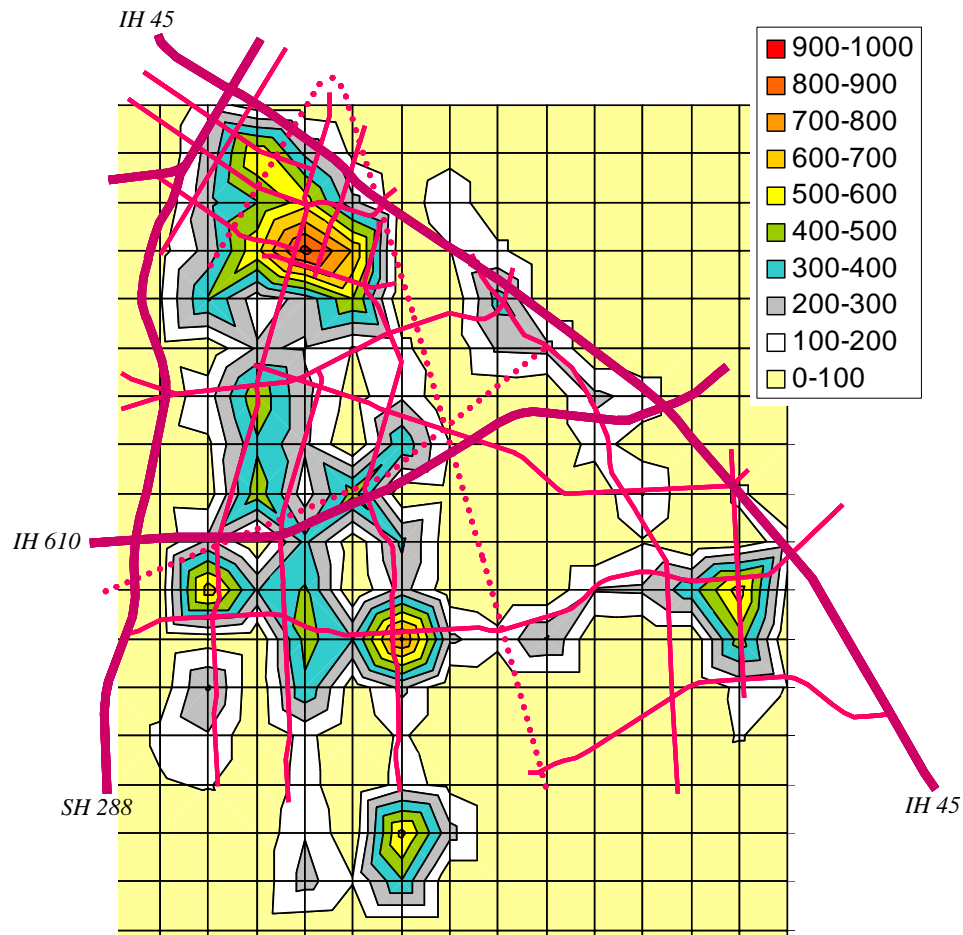
northwest, serving Reliant Park, the TMC, Greenway Plaza, and the Galleria. The substantial use of this route within the Southeast-Universities-Hobby corridor and the large number of

Figure 1-9. Weekday Bus Passenger Flows in the Southeast-Universities-Hobby Corridor, 1999-2000



Source: METRO ride check data, 1999-2000

Figure 1-10. Generalized Distribution of Weekday Passengers Boarding and Alighting from Buses in the Southeast-Universities-Hobby Corridor, 1999-2000



Source: METRO ride check data, 1999-2000

transfers occurring within the corridor show the importance of linking the corridor with major activity centers to the west. A closer look at the boarding and alighting data, however, shows that this cross-connection *within* the Southeast-Universities-Hobby corridor is also a very important function served by this route; there are more transfers between Scott Street and points east than between Scott Street and points west.

Non-transfer major sources of ridership are widely distributed but particular concentrations are seen at the universities, northwest of the universities especially along McGowan, along Scott Street between Yellowstone and Belfort, on MLK between IH 610 and Belfort and near the southern end of MLK, and along Broadway between Belfort and Hobby Airport. A transit service challenge in this study area is to provide good service to all of these widely dispersed clusters of passengers. It is apparent that a well-integrated and coordinated network of transit routes is necessary.

Another finding from the boarding and alighting data is that travel between the universities and locations to the south (including southwest and southeast) appears to be more prominent than travel between the universities and downtown or other northerly areas. This does not negate the importance of movement between downtown and the corridor, but shows that

good connectivity between the universities area and the remainder of the corridor, including its connections to the west, is a vital part of any transit improvement program. The Southeast-Universities-Hobby Planning Study will seek to evaluate the adequacy of existing transit services in this respect.

1.4.3 Future Level of Public Transportation Service and Use

As the metropolitan area in general and Harris County and the METRO service area in particular address the transportation implications of an additional three million residents by 2025, transit will be called on to handle an ever increasing percentage of the work based trips. The two million new residents in the METRO service area make it essential that AHCT be added to provide the spine of the system and the capacity required to provide an alternative to travel by automobile.

METRO Mobility, the long range plan for METRO's transportation improvement program, envisions continued expansion of all the facilities, systems, and services currently provided. Within the Southeast-Universities-Hobby area, route refinements and additions are shown in a "No Build" network that will be used as the basis against which AHCT alternatives will be evaluated. In the No Build network, a new route, the 3 Southmore-Belfort¹ will replace the current 5 Southmore, providing a simplified routing with fewer turns and less use of minor residential streets. The 73 Belfort will gain an extension across IH 45 into South Houston, strengthening access between the Corridor and trip origins/destinations east of IH 45. Route 297 South Point – Monroe - TMC, which connects with the Monroe Park & Ride on IH 45 just east of Hobby Airport, will add service on IH 610 to its present routing via IH 45. This addition will serve the new Gulfgate Transit Center and provide an alternate connection to the TMC. A new Route 416 Airport Crosstown will cross the lower part of the Corridor, linking the Monroe Park & Ride and Hobby Airport with the proposed South Freeway Park & Ride at SH 288 and Airport Boulevard. New Route 499 Hobby – NASA will also link Hobby Airport and the Monroe Park & Ride. Another new route, 543 Reed Road Crosstown, will interconnect several north-south routes in the Corridor with the new South Freeway Park & Ride. This park & ride will be provided with new Route 906 South Freeway Express, routed via SH 288 to the Wheeler light rail station, the bus then continuing into downtown.

Preliminary forecasts for the program in the year 2025 indicate substantial growth in public transportation services and use. Those forecasts will be refined as progress is made on definition of key aspects of the program, including selection of Advanced High Capacity Transit projects. Year 2025 No Build transit network in the Southeast-Universities-Hobby corridor would yield approximately 85,100 weekday passenger boardings. Compared with the corresponding figure for 1995 of 60,200, this forecast indicates an increase of 41 percent. The increase is attributable in part to growth in population and employment, but benefits also from continual improvements in transit service in context with intensifying mobility problems as the metropolitan area continues to grow in size, density, and amounts of travel. Further growth in the role of public transportation will accrue as major transit investments are made.

1.5 Transportation Goals and Objectives

1.5.1 General

The development of transportation goals and objectives for the Southeast-Universities-Hobby Planning Study has at its root the necessary considerations from a federal, regional, and local

¹ The bus route numbers indicated here are interim numbers used only for purposes of identification in the future No Build network referenced in the text. Routes that may eventually be the subject of final planning or implementation can be expected to have different numbering.

perspective. As a consequence the general federal guidelines and criteria, the H-GAC goals, objectives and measures, the goals and objectives of the METRO Mobility Program, comments received from the public during previous studies, and the scoping process for the corridor must all be considered and structured in a way that is mutually supportive.

1.5.2 Federal Guidance

The passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) by Congress in 1991 made substantial changes to the legislative basis for the criteria that the FTA applies in awarding grants using Section 5309 "New Starts" funds (formerly Section 3) to support transit capital investment projects. Whereas in the past major transit investment projects were required to be cost-effective, the criteria were expanded to include the requirement that projects be "Justified", based on a comprehensive review of mobility improvements, environmental benefits, cost-effectiveness, operating effectiveness, and transit supportive land use policies and patterns. The FTA New Starts criteria include: (1) Project Justification Criteria, and (2) Local Financial Commitment Criteria. The notice establishing the federal goals, objectives and measures also indicate that the selection and ranking of specific goals, objectives and measures is to be based upon local decisions. These criteria with minor modifications have been carried forward in "TEA-21", the currently effective legislation.

Specifically, the current criteria used by the FTA in considering New Starts applications include:

- Financial;
 - Evidence of affordability;
 - Capital plans;
 - Operating plans; and
 - Local financial commitment;
- Mobility;
 - Transportation user benefits;
 - Low income households served; and,
 - Employment served;
- Environmental benefits;
- Operating efficiency (cost per passenger trip);
- Cost effectiveness (annualized total cost per unit of annual transportation user benefits); and,
- Land use (evidence of transit-supportive existing and planned land use).

The project has been structured to follow procedures consistent with requirements that satisfy federal funding guidelines. The sequence of steps employed is as follows:

1. Scoping
2. Alternatives Analysis
3. Conceptual Engineering/DEIS

4. Preliminary Engineering/FEIS
5. Final Design
6. Full Funding Grant Agreement
7. Construction
8. Operation

This corridor planning study is intended to satisfy the requirements for the first three steps in the project implementation process. The initial findings presented in this draft AA report, along with the extensive public comment, will be reviewed and discussed with the METRO Board as input to the formulation of an updated regional system plan. Based on these findings and input from the other corridor AA's and system planning efforts, the METRO Board will assemble a draft regional system plan. With the help of the public, the Board will modify the draft plan and formally adopt the System Plan. In a general sense the System Plan will define the LPIS for the Southeast Corridor. The specific LPIS technology and alignment will be the subject of subsequent development of AHCT in the Southeast Corridor.

1.5.3 Regional Guidance

The 2022 Metropolitan Transportation Plan prepared by the H-GAC provides a planning framework and discussion of the factors that forged the plan: a combination of technical analyses, regional priorities and legislative requirements. These issues are the foundation of the framework for the 2022 MTP. The framework itself is organized into a hierarchy comprised of a vision and eight major goals. The vision statement is as follows:

“The Houston-Galveston Regional Metropolitan Transportation Plan will enhance mobility by providing an efficient, affordable, safe and environmentally responsible transportation system for both people and goods.”

Goals provide the means for attaining the vision. While the vision is intrinsically general in nature, the goals must be more specific to serve as milestones towards the ultimate objective. The H-GAC's analysis of the components of the vision and the regional issues discussed resulted in the formulation of eight goals to serve as milestones towards completion of the vision. The goals describe a preferred condition and are stated as norms, and are listed below in no rank order.

1. Increase the number of travel choices for people and freight movement.
 - Evaluate transit options, including urban rail, in all travel corridors where major transportation improvements are being considered.
 - Where feasible, provide transit options for those who cannot or choose not to drive a car.
 - Improve the ongoing public education programs on alternatives to driving alone.
 - Develop a variety of transportation solutions that meet the unique needs of each community in the region.
 - Develop a system of connected bicycle and pedestrian facilities within each community and throughout the region.

- Evaluate adding new bicycle and pedestrian facilities in all roadway construction or major maintenance projects.
2. Adequately maintain current roads and transit services.
 - Give priority to maintaining, operating, and managing existing roadways and transit services over expanding those facilities and services.
 3. Promote coordinated land use and transportation development.
 - Transportation projects should support regional and local land use policies and plans.
 - Transportation projects should promote community and neighborhood cohesion.
 - “Smart growth” and compact land use development should be encouraged with appropriate transportation investments.
 4. Improve access to and connections within the transportation system.
 - Provide convenient transfers between connecting methods of travel necessary to complete a trip.
 - Design future HOV facilities to provide easy access onto and off the facilities.
 - Improve local streets necessary for shorter distance trips.
 5. Efficient movement of people and goods.
 - Consider the needs of freight movement in all aspects of transportation development.
 - Encourage the active involvement of freight shippers in transportation development.
 - Improve street and sidewalk access to transit services and encourages land uses that promote transit ridership.
 - Use new, proven technologies to increase efficiency of our transportation system.
 6. An environmentally responsible system.
 - Minimize the negative impacts of transportation projects on the physical and social environment of communities.
 - Include in transportation project budgets sufficient funding to mitigate a project’s environmental impacts to an acceptable level.
 - Give priority to programs that reduce vehicle emissions.
 - Provide incentives to encourage the use of alternatives to driving a car alone.
 7. A cost effective and affordable transportation system.
 - Foster governmental cooperation to avoid duplication and minimize costs.

- Encourage the joint development and operation of transportation facilities to reduce costs and maximize benefits.
- Consider life cycle costs and cost/benefit analyses in transportation project selection.

8. Safe and secure movement of people and commodities.

- Identify and improve roads for evacuation during emergencies and natural disasters and support emergency management programs.
- Identify and maintain roads and railroads for the transfer of hazardous materials.
- Design and operate transportation facilities and services to be safe and secure for the public.
- Where feasible, provide grade separations on all major rails corridors.
- Identify and eliminate safety hazards.

1.5.4 Incorporating the goals into the MTP

The goals described above provide the reference point for the identification of regional needs and priorities. Whenever possible, performance measures were developed to assess the potential of projects and programs to further the goals of the 2022 MTP. During the project review phase of the MTP development, special characteristics of projects were identified such as a project's relationship to intermodal facilities, whether or not it advanced the goal of multimodalism, or filled "gaps" in the existing system to create more seamless connections. All projects were reviewed for their cost effectiveness in terms of their potential to reduce travel times or emissions.

Financial considerations and public participation were two key elements in the development of the 2022 MTP. Public comment was encouraged throughout the process. Indeed, public comment was the driving force behind the development of MTP goals. The project and programs proposed by the public and regional transportation providers were constrained by the financial realities of revenues versus expenditures. The general guidance provided by the MTP goals was also considered in establishing the METRO Mobility Program, its vision and its goals and objectives.

1.5.5 METRO Mobility Program

The METRO Mobility Program is built upon goals articulated in the August 1999 report, METRO's Vision for the 21st Century High Capacity Transit. The report states the following:

"The use of transportation and transit facilities in some corridors will need to evolve in response to growth in regional population and employment and the resultant increase in travel demand. In other corridors the best approach may be to develop new transportation facilities that work in concert with other land use strategies to guide redevelopment according to adopted policies and goals. It is imperative that future transportation facilities and services respond to growth and, where appropriate, help guide that growth into economically and environmentally beneficial programs."

The same report also states:

“...The vision must concentrate on needs and opportunities to advance regional mobility, enhance economic development, and re-shape land use in specific corridors.”

A year earlier, in the spring of 1998, a report entitled System Plan for METRO Regional Transit Plan (Horizon 2020) lists these goals and objectives:

- Deliver reliable, safe, clean, convenient, and customer-oriented public transit services.
- Strive for balanced, effective, cost-efficient mobility improvements and utilize partnerships with other government agencies, when possible.
- Meet METRO’s mandate to relieve traffic congestion and mitigate air pollution.
- Contribute to the economic vitality of the region.
- Lead the transportation industry in developing and testing progressive, workable solutions and management techniques.
- Develop a diverse, highly skilled, creative and customer-focused work force that can respond to ongoing mobility challenges and opportunities.
- Commit to a sound fiscal policy and to honest and responsible guardianship of the public resources entrusted to METRO.

1.5.6 Other Studies

In 1998, the *Southeast/Universities Corridor Study* was completed by METRO and its consultant team, as mentioned earlier in this report. That study, which addressed transit services within the inner portion of the present study area, investigated immediate-action or short range improvements in transit services and transit-related facilities. It identified the following service objectives:

- Comprehensive access to major transit routes
- Transit access to essential services
- Improved connections to downtown and TMC
- Coordination with internal TSU and UH routes
- Strategically selected capital improvements and bus stop locations

1.5.7 Proposed Goals and Objectives

Consistent with the local, regional and federal content discussed above, the alternatives for the study were evaluated through a two-step process. The initial step, used to assess the viability and responsiveness of the long list of potential alignment segments and their formation into alternative AHCT routes, was evaluated using general criteria derived from the goals and objectives identified for the Southeast-Universities-Hobby Planning Study.

After corridor stakeholders reviewed and discussed the results of the initial screening process, consensus was reached on a short list of alternatives that were carried through the second step in the evaluation of alternatives. The goals and objectives provided the basis for this more detailed evaluation.

Proposed goals and objectives, subject to public review and comment, are included in Table 1-6. Their correlation with the goals listed in Section 1.5.3, Regional Guidance, is indicated in Table 1-7. The specific measures to assess the alternatives' responsiveness to the goals and objectives will be developed based on the public's input as well as on federal (FTA) requirements.

Table 1-6. Southeast-Universities Hobby Corridor Study Goals and Objectives

Goal No.	Goals	Objectives
1	Develop a multimodal Transportation system	<ul style="list-style-type: none"> • Improve transportation system accessibility and connectivity. • Reduce the time necessary to travel to and between the primary job markets and activity centers (CBD, Texas Medical Center, universities, Hobby Airport, other major centers of employment and services). • Improve transportation options for socially, economically and physically disadvantaged groups. • Reduce dependency on automobiles. • Provide an alternative to highway travel delays and congestion by means of additional transit capacity and quality.
2	Improve the efficiency, reliability, capacity and safety of existing transportation facilities	<ul style="list-style-type: none"> • Provide direct transit connection to major activity centers. • Provide area residents with enhanced transit options for a variety of trips within the corridor and region. • Provide more direct connections between the corridors of residential and commercial activities. • Provide safe, reliable and secure transit services.
3	Preserve social integrity and support of urban communities	<ul style="list-style-type: none"> • Connect high volume pedestrian activity centers. • Serve existing and future high-density residential populations. • Provide transit investment supportive of redevelopment/development and land use plans. • Minimize traffic impacts on local streets within the study area. • Minimize impacts during construction. • Minimize right-of-way requirements.
4	Plan for transportation projects that enhance the quality of the environment	<ul style="list-style-type: none"> • Improve air quality by reducing automobile emissions and pollutants. • Protect sensitive areas such as wildlife habitats, wetlands, and historic and cultural sites. • Provide a transit option to mitigate excessive parking demand and encourage a sense of place and neighborhood.
5	Define a sound funding base	<ul style="list-style-type: none"> • Provide equitable transportation services and benefits to all geographic areas and constituencies. • Provide for equitable sharing of the costs of transportation improvements among those who benefit from them. • Maximize the economic benefits gained from transit capital investments.

Table 1-7. Correlation Between Southeast-Universities Hobby Corridor Study Goals and Objectives and the 2022 Metropolitan Transportation Plan Goals

2022 MTP	1	2	3	4	5	6	7	8
Southeast-Universities-Hobby Planning Study								
1. Multimodal transportation system	◆				◆			
2. Efficiency, reliability, capacity, and safety		◆		◆	◆			◆
3. Social integrity and community support			◆					
4. Enhancement of environmental quality						◆		
5. Sound funding							◆	

1.5.7.1 Evaluation Criteria for Screening of the Long List of Alternatives

Consistent with the local, regional and Federal content discussed above and the Goals for the Southeast-Universities-Hobby Planning Study, the alternatives for the study were evaluated through a two-step process. The evaluation process was developed in close coordination with and based on input from the Community Involvement Committee (CIC) and the stakeholders at large. In the initial step, the viability and responsiveness of the long list of potential alignment segments were evaluated using the criteria and screening measures listed in Table 1-8. These were applied at two levels, first as a means of identifying segments having "fatal flaws" that made them unsuitable for further consideration. Secondly, the criteria were applied to the remaining segments of alternative routes to identify those having insufficient promise to warrant use in formulating route alternatives for detailed evaluation during the Alternatives Analysis phase of the work. The division of the study area into sectors employed for the initial screening of the long list of alternative segments into the shortlist is documented in Chapter 2 of this report.

The CIC participated in both of these screening levels, by reviewing and indicating modifications as appropriate to the results of the analysis prepared by the project technical team. After review and discussion with the corridor stakeholders, consensus was reached on the list of route segments and overall route alternatives carried through detailed evaluation.

1.5.7.2 Detailed Evaluation

The screening criteria and measures identified above provided the basis for narrowing the Long List of transit improvement alternatives, by removing from further consideration those alternatives that are clearly inferior in one or more consequential respects and therefore had little promise of constituting best solutions to the problems being addressed.

The alternatives that survived this screening process constituted the Short List, and these surviving alternatives were then the subject of further conceptual definition, and detailed evaluation. The detailed evaluation criteria were derived from Goals and Objectives established for the potential implementation of Advanced High Capacity Transit in the Southeast-Universities-Hobby Corridor (see Table 2-1). The evaluation also was designed to be consistent with the H-GAC Long Range Transportation Plan (LRTP), to justify projects as FTA New Starts, and to assure satisfaction of the National Environmental Policy Act (NEPA) requirements. These issues are consistent with the Goals and Objectives for the corridor but involve developing and presenting information about the alternatives in particular formats that can be prepared on a consistent basis for all projects submitted to the FTA. Pursuit of the New Starts data in this AA phase was limited to what will be required to identify the LPIS. The full New Starts criteria will be applied to the LPIS during the DEIS phase of project development. The resulting evaluation criteria and measures are listed in Table 1-9.

Further criteria, to be considered separately, are to assure functional soundness of the proposed transit technology (e.g., use of a proven technology), and to assure the financial strength of the planned improvement (e.g., affordability in terms of consistency with sound capital and operating plans; evidence of ample local funding commitment). Consideration of these objectives is vital in the ultimate formulation of a METRO's LPIS, but not directly relevant in the choice made among the Short-Listed route alternatives

Table 1-8. Criteria for Initial Screening of Conceptual Alignment Alternatives

Criteria	Screening Measures
Design	
Right-of-Way Constraints	Initial assessment: width of street right-of-way allows for exclusive bus lanes or rail transit guideway, plus local access traffic lanes and pedestrian walkways
Traffic Impacts	Qualitative: reflecting potential of relieving congestion or creating additional congestion as a result of project implementation
System Expansion Potential	Qualitative: evaluation of alignment and capacity/service expansion possibilities
Cost	Qualitative: evidence of significantly lower or higher capital or operating and maintenance cost compared with other alternatives
Environment and Neighborhood	
Environment, Community, Land Use	Qualitative: based on proximity to and potential to coexist with sensitive land uses (parks, natural areas, historic and cultural resources, residential areas) and likely adverse impacts or displacements of existing uses (i.e., any "fatal flaws")
Ease of Implementation	Qualitative: political, institutional, approval-process, or other hurdles that would severely delay or forestall implementation of an alignment alternative
Community Support	Qualitative: based on feedback received from the public
Economic Development	
Economic Development Potential	Qualitative: potential of an alignment alternative to spur economic revitalization, development or redevelopment
Demand	
Existing Transit Market	Ridership data on existing bus lines (travel patterns, passengers boarding and alighting)
Service to Employment Centers	Semi-quantitative: Current/future year employment within easy walking distance of alignment
Service to Residential Centers	Semi-quantitative: Current/future year population within easy walking distance of alignment

The consideration of transit technology, addressed in a separate Technology Assessment Technical Memorandum, concludes that there are two transit modes meeting functional requirements of AHCT within the corridor. These are Light Rail Transit (LRT) and Bus Rapid Transit (BRT). BRT would be designed to allow later conversion to LRT if future conditions warrant. The methodology and results of the transit technology assessment, as with other aspects of the evaluation of alternatives, were subjected to review by the Community Involvement Committee, other stakeholders, and the public at large.

The choice between LRT and BRT will involve other objectives, including community support, economic revitalization and development potential, financial issues (e.g., affordability) and carrying capacity. The choice also will be influenced by the objective of assuring system connectivity and expandability (how AHCT in the Southeast-Universities-Hobby corridor links with or integrates with the overall METRO Mobility 2025 high capacity network). The choice of technology will be considered jointly with METRO and METRO's General Planning Consultant, in context with continuing refinement of plans for other AHCT corridors within the METRO service area.

Financial issues including affordability and the strength of local financial commitment are also subject to joint consideration with METRO and METRO's General Planning Consultant, in context with continuing refinement of plans for other AHCT corridors within the METRO service area. Evaluation measures included in Table 1-9 will result in the preparation data for the Southeast-Universities-Hobby corridor alternatives necessary to combine with overall METRO program data to facilitate these systemwide decisions.

Ease of implementation is an objective requiring consideration. This objective entails consideration of issues such as potential involvement with other agencies and their projects, community support (or opposition), right-of-way constraints, engineering obstacles or various

plans within the corridor that may be affected by or have an effect on the AHCT plan. The probability of delay or difficulty in implementation because of such interrelationships may affect the viability of an alternative. Note that some of the criteria and their measures will be subject to further definition and refinement during the post-AA phase of this project, when the DEIS will be prepared.

It will be seen that some of the measures in the table occur more than once. Such duplication was avoided in summarizing evaluation results, which focused on the measures used. Development of information about each measure follows from the conceptual definition of the short-listed alternatives and related analyses. These analyses include conceptual design of each alternative, including station locations, facilities for storage and maintenance of vehicles, and typical configurations of required line and station types. On the basis of the conceptual design, a preliminary determination was made of right of way required, and consequent displacements. Capital cost estimates were prepared. An operations plan including related bus services was prepared for each alternative, and used in making travel demand forecasts. Operations data provides the basis for estimation of annual operating and maintenance costs for each alternative.

The travel demand forecasts yield estimates of transportation user benefits as well as detailed information regarding transit passenger travel, including total transit passengers carried, number of passengers using AHCT, peak-period maximum passenger loads to be served by AHCT, passenger miles, and passenger hours. As described later in this report, however, evaluation of the short list is based on preliminary demand assessment rather than the formal demand forecasting process. The physical and operational characteristics of the transit system as specified for each alternative provide the basis for quantitative or qualitative analysis of other evaluation measures, including summaries and specific examples of travel time or accessibility improvements that would be gained, total and low income population within walking distance of stations, employment within walking distance of stations, changes in private transportation vehicle miles of travel, traffic level of service, construction-related issues, potential noise issues, effects on sensitive land uses or other environmental issues, and area-specific transportation benefits.

Tabulation of the results for each of the measures was organized for convenience in demonstrating significant differences among the alternatives. A summary evaluation highlights those differences in ways that are easily understood and can be presented effectively to decision makers including stakeholder groups, the general public, technical staff, the Steering Committee, and the METRO Board.

In evaluating the Short List, most of the evaluation measures are applied not only to whole AHCT routes, but also to subdivisions or segments. By so doing, it was possible to identify preferred segments of routes, rather than being bound by the entire alternative AHCT route. The advantage of this approach is that it is not necessary to define and analyze an individual route for every possible combination of the Short-listed segments, which would result in having to test as many as sixteen or more alternatives. The AHCT route finally preferred may be a combination of individual segments from more than one of the alternatives carried through detailed evaluation.

1.5.8 The Use of Results of Detailed Evaluation

After the technical analysis of Short-listed alternatives was completed, an evaluation framework was developed, in conjunction with the CIC and corridor stakeholders at large, to display the results in a manner that permitted comparison on a consistent basis and was also responsive to the many persons interested in the final decision. The framework also functioned to highlight those characteristics of the alternatives that show the greatest differences, thus allowing citizens and policy makers to identify and make decisions.

Table 1-9. Objectives and Corresponding Evaluation Measures

Objectives	Measures (compare Alternatives to Base and to one another)
<ul style="list-style-type: none"> ● Maximize transportation user benefits. ● Provide area residents with enhanced transit options for a variety of trips within the corridor and region; improve transportation system accessibility and connectivity. ● Provide direct transit connection to major activity centers; reduce the time necessary to travel to and between the primary job markets and activity centers; provide a more direct connection between the corridors of residential and commercial activities. (CBD, medical center, universities and Hobby Airport). ● Improve transportation options for socially, economically and physically disadvantaged groups. ● Maximize transit passengers carried; provide an alternative to highway travel delays and congestion; reduce dependency on automobiles. 	<ul style="list-style-type: none"> ● Change in transportation user benefits ● Change in door-to-door transit travel times, for Base trip origins within the corridor ● Change in door-to-door transit travel times from representative residential trip origins and major activity center destinations, and among major activity centers ● Low income population within one-fourth mile of transit stations; employment within one-fourth mile of transit stations ● Change in linked transit passenger trips; change in vehicle miles traveled
<ul style="list-style-type: none"> ● Minimize cost per passenger trip or passenger mile carried ● Make transit services more cost effective, relative to the transportation user benefits provided ● Provide higher transit system passenger capacity including reserve capacity for future needs ● Provide a safe, reliable and secure transit service. 	<ul style="list-style-type: none"> ● Change in operating cost per passenger trip or passenger mile carried ● Change in capital and operating cost per unit of transportation user benefits ● Planned and potential maximum passenger capacity in the AHCT corridor; projected passenger demand ● Miles of reserved transit right of way; security provisions planned
<ul style="list-style-type: none"> ● Connect high volume pedestrian activity centers. ● Serve existing and future high-density residential populations. ● Provide transit investment supportive of redevelopment/development and land use plans; demonstrate existing and future transit-supportive land use. ● Minimize traffic impacts on local streets within the study area. ● Minimize impacts during construction. ● Minimize right-of-way requirements and displacements. 	<ul style="list-style-type: none"> ● High volume pedestrian activity centers within one-fourth mile of stations ● Population within one-fourth mile of stations ● Identification of existing and planned transit-supportive land use; demonstration of recognized development potential at planned AHCT station sites. ● Change in traffic level of service on streets affected by the project ● Anticipated impacts during construction; anticipated mitigation measures ● Preliminary estimate of right of way requirements and consequent displacements
<ul style="list-style-type: none"> ● Improve air quality by reducing automobile emissions and pollutants. ● Minimize adverse noise and vibration. ● Protect sensitive areas such as wildlife habitats, wetlands, historic and cultural sites, etc. ● Provide a transit option to mitigate excessive parking demand and encourage a sense of place and neighborhood. 	<ul style="list-style-type: none"> ● Change in vehicle miles and pollutant quantities; status of regional conformity ● Screen alternatives for affected properties ● Effects on wildlife habitats, wetlands, parklands, historic and cultural sites; identify any significant farmlands affected; review major land features affecting alternative routes; note hazardous materials constraints; identify any navigable waters; identify affected tree plantings of local importance; identify visually sensitive areas; count water crossings ● Change in park & ride demand; urban places and neighborhoods supported through transit station locations; consistency with local plans; identifiable environmental justice issues
<ul style="list-style-type: none"> ● Provide equitable transportation services and benefits to all geographic areas and constituencies. ● Provide for equitable sharing of the costs of transportation improvements among those who benefit from them. ● Maximize the economic benefits gained from transit capital investments. 	<ul style="list-style-type: none"> ● Change in transportation user benefits; gains or losses in transit riders, by geographic area or political jurisdiction ● Change in revenue sources by which transit is funded (disregard if it is the same for all alternatives) ● Change in annual cost (annualized capital cost plus annual operating and maintenance cost) per unit of annual transportation user benefits

To accomplish this objective, the evaluation data for the full set of evaluation measures were arrayed in a summary matrix with the evaluation measures listed vertically in rows along the left side of the matrix and the alternatives listed horizontally in columns across the top of the matrix.

In addition, trade-off analyses were developed, to demonstrate how the evaluation results related to issues such as interactions among criteria (e.g., reducing travel times may result in higher capital cost or reduction in population or employment served); performance of the alternatives in terms of goals and objectives attainment; and combinations of measures that relate to a particular user group or impact area.

The evaluation results for the measures were also examined for their relative contribution to the comparative evaluation process, and a "focused" evaluation produced, in which measures that produced results differing significantly across alternatives were listed.

In addition, the Evaluation of Alternatives contains text, tables, and graphics presenting results of the evaluation of alternatives. Comments from the public are summarized, for use by the decision makers.

1.6 Specific Problems Related to the Study Area

1.6.1 Transit/Roadway Deficiencies

Comments noted in a number of public meetings within the Southeast-Universities-Hobby area call attention to poor quality streets used by various bus routes, and ill-maintained or missing sidewalks in locations used for access to buses. The availability or condition of bus shelters is also a subject of complaint.

Transit service and use are at a high level within the corridor compared with other corridors served by METRO. Services are local and operate at an average revenue service speed of 12.5 miles per hour. This is typical of local bus services in Houston and in many other cities, and is adequate for trips that are not too long or that do not require transfers. These services leave something to be desired when they are all that is available for regionally oriented trips. An attractive service – one that is an acceptable alternative to people to whom a car is available and is not onerous for those who have no choice of mode – should provide higher average speed and minimal transfer times.

Existing use of the available transit services does not reveal travel patterns that are inadequately served by the transit system, although significant circuitry exists for many trips between the corridor and the metropolitan area to the west. A comparison of transit passenger travel patterns with overall travel patterns (trips by all modes) for the Southeast-Universities-Hobby corridor shows that non-CBD regional travel, with a few exceptions such as the TMC area, is less likely to use public transportation than is CBD-oriented travel.

The basic street network appears generally adequate for its level of use, but is of inconsistent quality. Limited-access routes serving the corridor are SH 288 and IH 45 (the Gulf Freeway) along the corridor boundaries, and IH 610, which crosses the corridor. The freeways are generally near or beyond capacity during peak periods in the peak direction. Most arterials are operating well below their capacity and provide a reasonable level of service for the shorter (non-regional) trips within the Corridor. There is an extensive network of arterial streets and boulevards, with no prominent missing links.

1.6.2 Linkage Deficiencies

While the Southeast-Universities-Hobby corridor is strongly linked to downtown Houston by means of several bus routes that provide direct service for large parts of the corridor, there is

little direct bus service to the Midtown area south of McGowan. Farther south, the 26/27 Outer/Inner Loop Crosstown provides access to the Texas Medical Center (TMC) and the VA Hospital, but without a high frequency of service. These routes form matching complete clockwise and counter-clockwise loops inside IH 610, but most of their passengers to or from points within the corridor must transfer from other bus routes. The 73 Bellfort Crosstown has a higher level of service and provides access to the TMC, Greenway Plaza, and the Galleria. Within the Southeast-Universities-Hobby corridor the 73 is a crosstown route located south of IH 610 South. It is well used, but again mainly by means of transfers to and from other corridor bus routes.

1.6.3 Air Quality Concerns

Public transportation has an important role to play in regard to air quality, because of the high fuel efficiency attainable by most kinds of public transportation service, and including the potential for use of low-pollution or no-pollution energy sources. Although the greatest potential for reduction in transportation-caused air pollution lies in measures affecting emissions from private and commercial vehicles, such measures may result in higher costs for the use of those vehicles, and consequent increased diversion of trips from private to public transportation modes. Improvement of the public transportation system to attract and accommodate those trips is an important part of the air quality improvement strategy.

1.6.4 Other Issues

Introducing simultaneous two-direction HOV service along the Gulf Freeway within the time horizon of this study may be accomplished but would not effectively serve the Universities, nor the bulk of the population and employment within the Study Area. The existing and potentially improved HOV facility may provide one of the best available public transportation means of travel between Hobby Airport and downtown, but does not link Hobby Airport with other portions of the Study Area.

1.6.5 Summary of Needs to be Addressed

The corridor is bounded by the CBD to the north, SH 288 to the west, IH 45 to the east, and Almeda-Genoa Road (north of Beltway 8) to the south. There are no radial freeways at present that transect the corridor. IH 610 crosses the corridor near its midpoint. Utilizing the existing freeways, particularly north of IH 610, would require some degree of "out of direction" travel adding to the length of the trip. Since the freeways are operating at or in excess of capacity during the peak periods, there are no travel time-savings to offset the longer trip required to access a freeway. As a consequence, travel in the corridor is generally focused on the few existing north-south and east-west arterials.

The public transportation system is built on this same network of arterials, and serves large north-south travel movements within the corridor. The bus trips south of Bellfort tend to be long and dispersed in response to the scattered origins of the trips. From Bellfort north, the bus trips tend to be concentrated on a relatively small number of arterials within the west side of the corridor. Many of these trips begin and end within the corridor or have the CBD as their destination; smaller numbers continue farther north or transfer in other directions.

Throughout the corridor, there are very large east-west movements as well. While these travel volumes are significant, they are to and from widely dispersed locations both within and outside the corridor. Some are served directly by east-west bus routes, but there is a notable gap in linkage between the corridor and Midtown, limited bus routing to the TMC area, and no direct bus services to southwestern Houston beyond the Reliant Park area.

Given the nature of the bus travel patterns in the corridor and the inherent deficiencies enumerated above, the following specific issues must be addressed in identifying the

appropriate AHCT investment for the corridor. Alternatives will be devised to address and strike the proper balance and compromise among the following main issues.

- Reduce in-vehicle travel times: accomplished by locating the AHCT investment along the spine of the system where most trips are concentrated. The AHCT stations and operating plan will be designed to maximize the technologies' speed advantages, as compared with the current local bus service in the corridor. Local buses replaced by this faster service can be reoriented to provide more effective transfers and feeder services to AHCT.
- Reduce waiting times and vehicle-to-vehicle transfer times: The introduction of AHCT will in some instances increase the number of transfers, but by providing improved frequency of service on both AHCT and the local and feeder bus routes, transfer times will be minimized. AHCT will operate with a high level of schedule adherence due to its extensive use of reserved right of way, and this predictability will also help to reduce passenger waiting times and inconvenience.
- Selectively relocate Transit Centers for optimal passenger transfer opportunities: If AHCT service is oriented north-south, for example, locating a Transit Center on Belfort at an AHCT station will minimize passenger distance and time on local bus routes and maximize the opportunity to make use of AHCT, with its higher travel speed. There will be accompanying opportunities to upgrade the bus services that bring passengers to the AHCT route.
- Upgrade transit infrastructure and systems: AHCT will constitute an investment in premium transit, including fast, high-quality, reliable service accessed at well-designed stations at convenient locations. Additional investment also needs to be made to the existing and redesigned feeder services at bus stops, access to bus stops along sidewalks, Transit Centers, parking, paving of streets used as bus routes, lighting, and other safety and security measures, landscaping, and passenger information systems which may include the use of advanced information technologies.
- Encourage economic development and revitalization: AHCT station sites can spur economic development. The stations will provide an attractive, permanent investment and a ready market to encourage development. Carefully sited and planned stations can serve as the center for small urban villages of mixed development consisting of residential, office, commercial and institutional facilities. A fixed transit investment can also improve access to existing businesses and public institutions, resulting in a revitalized community.
- Connect with the regional AHCT network: The AHCT investment in the Southeast-Universities-Hobby corridor must connect with the Downtown to Reliant Park light rail line and provide convenient access to the regional AHCT system at large. People from the corridor will be given direct access to all that the region has to offer, and people from outside the corridor will be linked conveniently to the public facilities, entertainment venues, universities, and Hobby Airport within the corridor.

1.7 Consistency with Local, State, and Federal Planning Process

1.7.1 Agencies Involved in the Corridor Planning Process

A comprehensive list of agencies were invited to and participated in the Agency Scoping Meeting held on February 27, 2002 for the three corridor studies. The *Scoping Results*

Report for the Southeast-Universities-Hobby Planning Study documents this and other Scoping meetings.

In addition, an Interagency Coordinating Committee has been established to monitor and guide the study. This Committee's membership includes the following:

- MPO Director, H-GAC
- Planning Manager, Harris County Public Infrastructure Department
- Transportation Planning and Development, Texas Department of Transportation
- Intermodal Team Leader, Federal Highway Administration
- Director, Planning and Development Department, City of Houston
- Mayor, City of Spring Valley
- Executive Director, Harris County Public Infrastructure Department
- Assistant Director, Harris County Toll Road Authority
- Community Planner, Federal Transit Administration, Region VI
- Director, Houston Airport System

1.7.2 Role of the AA in the Project Development Process

The AA is the phase in project development during which a comprehensive and impartial process is carried out to identify the most promising approach to transit improvement within a corridor. The process involves the following main steps, as specifically planned for the three concurrent corridor AA studies:

- Initiation of a continual dialog with the public, stakeholders, and interested agencies, to gain an understanding of issues, problems, and opportunities that should be addressed;
- Assessment of initial public and agency comment and study of available planning data, to develop a Purpose and Need Report;
- Development of a "Long List" of transportation improvement alternatives addressing the corridor's purpose and need, with emphasis on comprehensiveness and without prejudgment as to the merits of a particular idea. Alternatives may include both route alternatives and technology (transportation mode) alternatives;
- Screening of the Long List to eliminate alternatives that are clearly deficient compared with other alternatives, or that have "fatal flaws" such as insurmountable environmental effects, or physical problems that would be very costly to resolve;
- Detailed evaluation of the resulting short list of improvement alternatives, considering potential ridership, transportation user benefits, capital and operating costs, right of way and displacements requirements, effects on traffic, environmental issues, economic impact, and public acceptance; preparation of a report presenting the results of the evaluation;
- Conduct of a public hearing on the evaluation, and documentation of the public hearing and comments received; and,

- Selection (by the METRO Board of Directors) of the LPIS on the basis of the AA report, the system planning effort and public comment.

The METRO Board is in the process of preparing and adopting an updated System Plan for the service area. As a consequence the corridor decisions for the Southeast Corridor will be made in conjunction with those for the service area at-large based on the System Plan development process. A public hearing will be held at the conclusion of this process.

1.7.3 Documentation of Consistency with the Planning Process

The Southeast-Universities-Hobby Planning Study is being carried out in accordance with accepted practice and in full compliance with FTA guidelines and procedures. The project completed its Scoping Process, having prepared a Scoping Information Report, advertised and held open-house public meetings, and participated in a multi-corridor Agency Scoping Meeting. The Study scope, schedule and budget have been prepared to encompass data gathering, analysis, public involvement, and other steps appropriate to the identification of the major investment opportunities in the transit corridor, including advertising and holding a public hearing. In this case, public hearings will be held both as part of the process of adopting a system plan (selecting a LPIS) and at the conclusion of preparation of a Draft Environmental Impact Statement.

1.7.4 Relationship to Other On-going Studies

As explained earlier in this report, the Southeast-Universities-Hobby Planning Study is one of three such AA studies currently underway. Each of these three studies is expected to result in selection of an LPIS as part of the METRO Board's process in adopting an updated System Plan.

Another on-going study is the Inner Katy Transit Oriented Development Study, being sponsored by the City of Houston to identify a preferred location for a transit route (especially with regard to economic development opportunities) linking downtown Houston and the Northwest Transit Center, potentially also connecting with the Katy Freeway corridor and other corridors to the northwest.

Still another study is being carried out to evaluate the feasibility of introducing commuter rail service in the US 90A corridor to the southwest of Houston. This corridor envisions establishment of new passenger service in the Union Pacific railroad corridor paralleling US 90A and possibly connecting to the Downtown to Reliant Park light rail line at its southernmost station, south of IH 610.

Finally, METRO is conducting developmental studies in other corridors identified for potential AHCT service within the 2025 horizon. A particular emphasis of METRO and its consultants is to assure that all plans for individual corridors fit together as a regional network in terms of location, levels of service, and selection of modes (vehicle and systems technologies). To this end, METRO and its General Planning Consultant are engaged in a Regional Connectivity Study to identify the most effective way of connecting the study corridors in the downtown area.

The results of all of these studies will be compiled and addressed as part of the system planning process. The METRO Board is expected, after extensive public review and comment, to adopt the Plan in July 2003.

2. Alternatives Considered

2.1 No-Build Alternative

The No Build Alternative includes the Metropolitan Transit Authority (METRO) transit services and facilities that were programmed to be in operation in FY 2007 and the regional roadway/highway system that was programmed to be in place in 2022. The definition of the No Build Alternative was discussed with the Federal Transit Administration (FTA) during its development. A subsequent review concluded with a verbal approval of the concept from the FTA (conference calls held with FTA staff in the first quarter of 2002). It includes the implementation of the Downtown to Reliant Park light rail service, starting in January 2004, but incorporates no other new high capacity transit services. In addition to METRO service, the No Build Alternative includes bus service into Houston provided by the Brazos Transit District (Woodlands Service) and TREKEXPRESS (Fort Bend County/US 59 South). These services are listed in Appendix A. Appendix B presents METRO's transit capital facilities. Roadway improvements included in the No Build Alternative, except for I-45 north where future improvements were removed to test multiple I-45 highway options, are identified in the Houston-Galveston Area Council (H-GAC) 2022 Metropolitan Transportation Plan (Adopted February 25, 2000). As a result, all highway elements in the I-45 North and Hardy Toll road corridors represent a FY 2007 level of investment.

The transit service and roadway improvements included in the No Build Alternative respond to the substantial increase in the region's population and employment (Figure 2-1 and Figure 2-2). In twenty years, the Houston area will have two million more people and add over one million new jobs.² In addition, the number of motor vehicles registered in the eight-county region is expected to increase from 3.3 million in 1996 to 10.6 million in 2020. The additional trips generated by the new residents and jobs and the three-fold increase in motor vehicles will aggravate congestion on the regional roadway system that will need to be mitigated by multiple types of transportation projects.

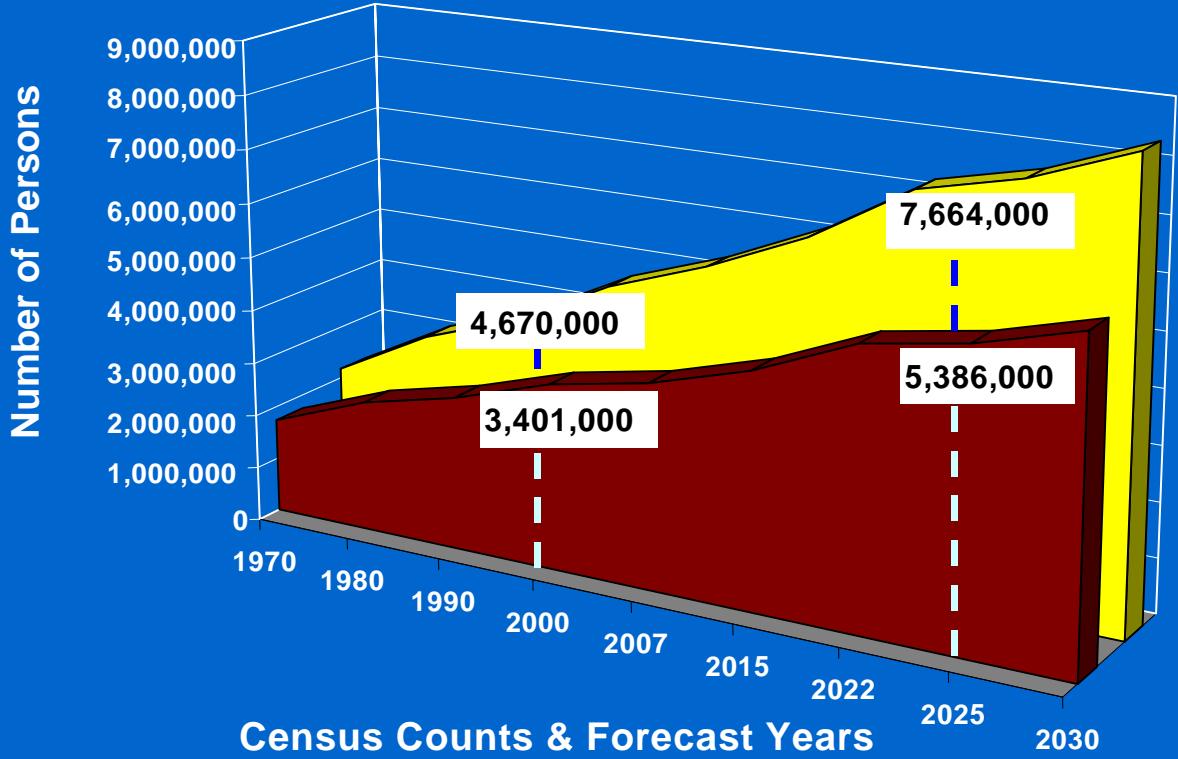
Accommodating this growth will require a team effort, with all transportation agencies aggressively making improvements. METRO intends to accommodate the increased demand for transit by initiating new bus routes, bus route enhancements, constructing new transit facilities, and implementing a network of Advanced High Capacity Transit. In addition, TxDOT and the Harris County Toll Road Authority (HCTRA) plan to increase regional freeway and tollway lane miles by 35 percent over the next 20 years.

2.1.1 Existing METRO Service and Programmed Improvements

METRO's service area encompasses 1,285 square miles comprising most of Harris County and small portions of Fort Bend, Waller, and Montgomery Counties (Figure 2-3). METRO provides approximately 6,700 route miles of service using over 1,450 buses on fixed-routes and special events service (such as sporting and community event shuttles). METRO operates bus service seven days a week, with weekday service operating from 3:47am (first bus in revenue service) to 2:27am (last bus in revenue service), weekdays. The span of service is less on weekends. As part of the fixed route system, METRO operates 36 commuter routes (express and park-and-ride) that serve the Central Business District (CBD) and other major, regional employment centers, primarily weekdays, during peak periods. METRO's fixed route services are listed by route, by type of service, and by peak/off-peak service frequencies in Appendix A. In addition, METRO offers paratransit services for the senior and disabled communities utilizing 118 vans and 124 sedans. METRO, in conjunction

² Houston-Galveston Area Council, Transportation Department, January 2003.

Regional Population Growth

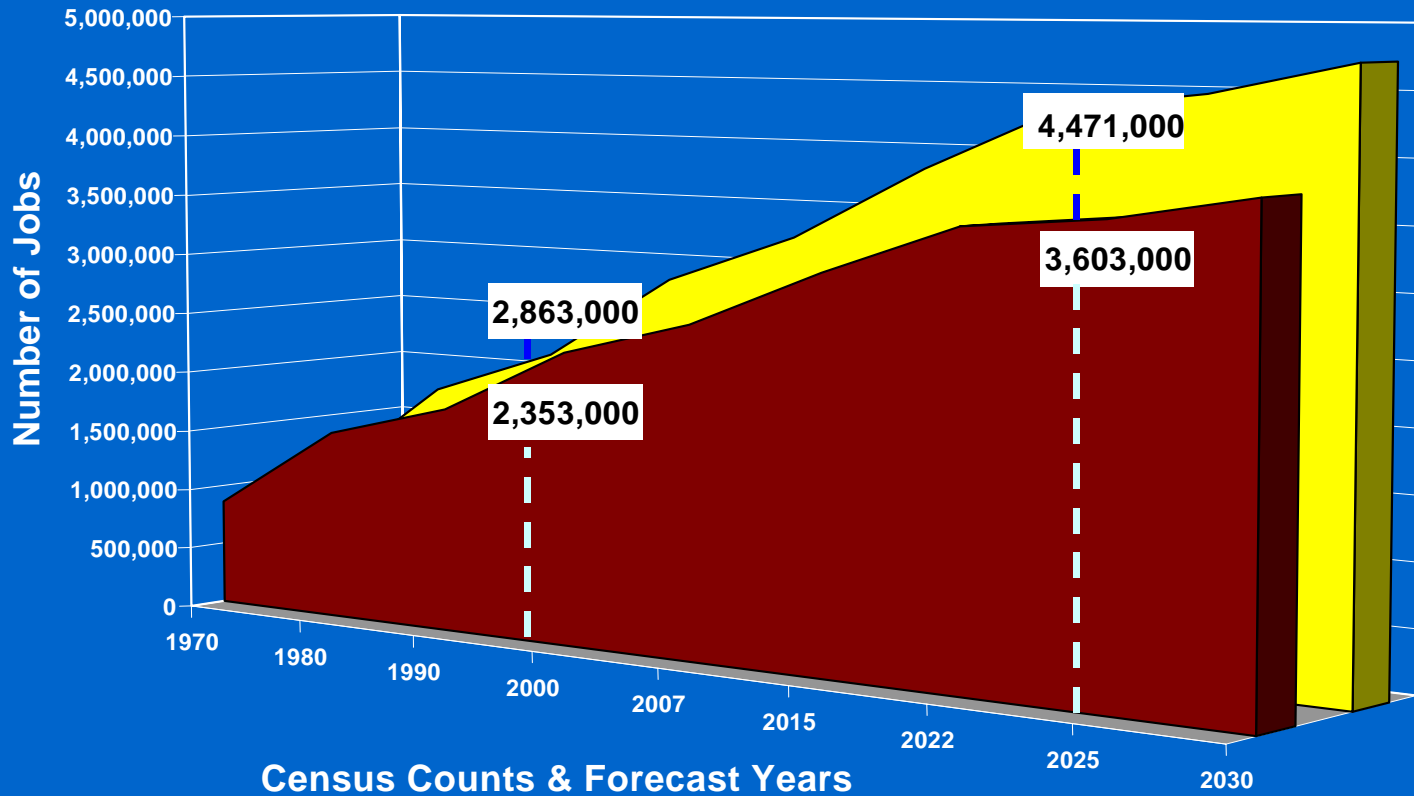


■ Harris County ■ HGAC 8 County Region

Source: (1970-1990) U.S. Bureau of Census, Profile of General Demographic Characteristics; (2000) U.S. Census Bureau, Census 2000 Summary File 2, current as of January 21, 2003; (2025) H-GAC-endorsed forecasts prepared by REMI Policy Insight, 2007-2030 Forecasts, January 9, 2003.



Regional Employment Growth

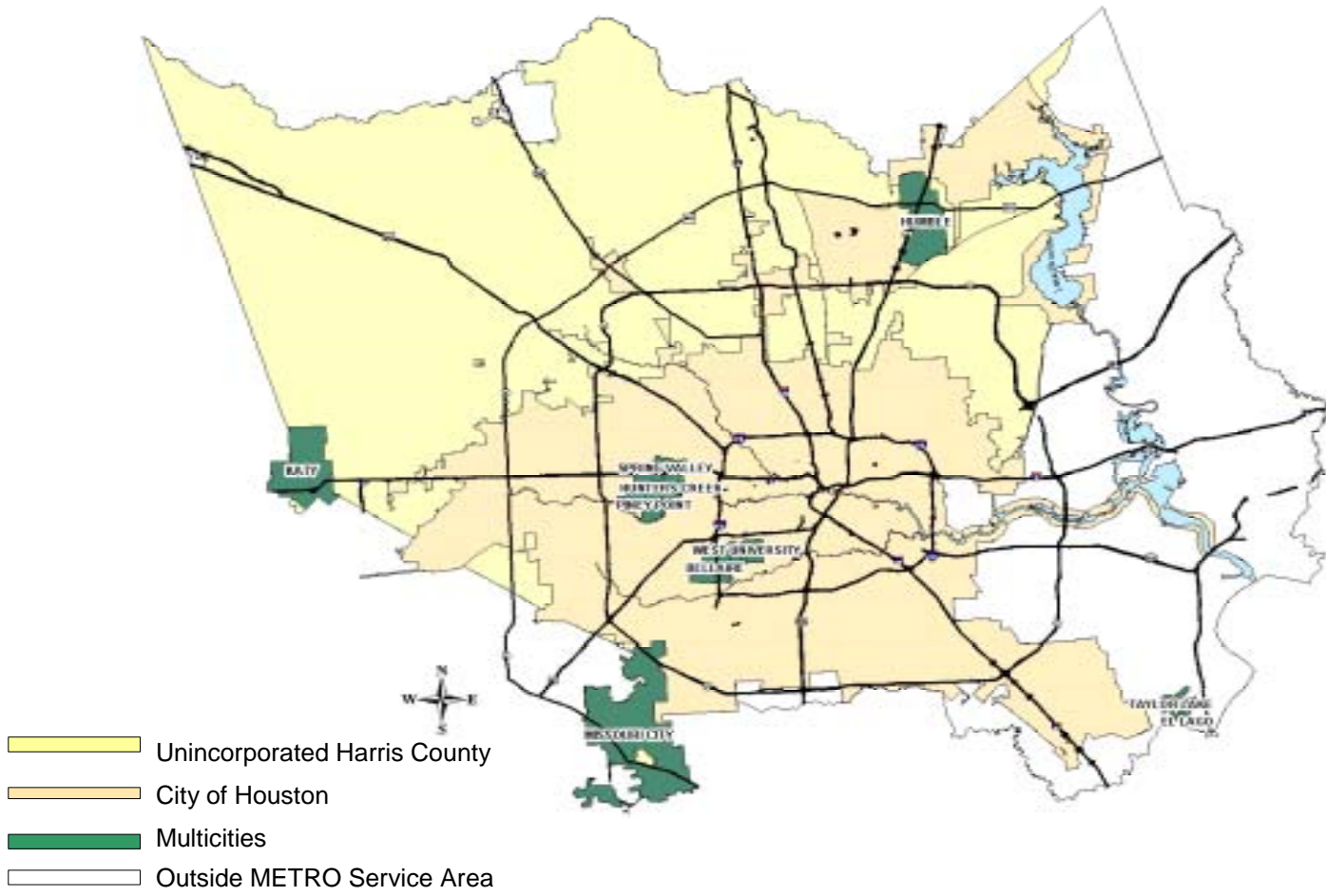


■ Harris County

■ HGAC 8 County Region

Source: (1970-2000) U.S. Bureau of Census, Socioeconomic Characteristics, provided by H-GAC; (2007-2030) H-GAC-endorsed forecasts prepared by REMI Policy Insight, 2007-2030 Forecasts, January 9, 2003.





Source: METRO Transit System Analysis, 03/18/03
 Base Map, METRO GIS & Cartography



with TxDOT, has funded and constructed over 100 miles of High Occupancy Vehicle (HOV) lanes on six freeways that METRO uses for many of its commuter routes.³

In FY2002, METRO carried over 97 million annual boardings on all fixed route and special bus services. In addition, over 20 million person trips in carpools and vanpools on METRO's HOV lanes contributed to systemwide annual boardings.⁴

In January 2004, METRO began operating the Downtown to Reliant Park light rail line with 16 stations, including one new Park & Ride lot, two transit centers, and a new light rail maintenance and storage facility (Figure 2-4). Light rail service will operate seven days per week, with weekday service operating between 4:30am and 12:38am. The span of service will be somewhat reduced on weekends. During peak periods, light rail is proposed to operate at six-minute intervals. In addition, METRO plans to provide a shuttle between Smith Lands Station and Hermann Park/Rice Station offering three-minute peak headways to the Texas Medical Center. During midday, light rail service will operate at six-minute intervals, increasing to 12 and 18 minutes during evenings and weekends, respectively.

Concurrent with the operation of light rail, METRO has programmed bus service improvements that include route alignment and service frequency modifications. All of these improvements are included in the No Build Alternative for this study. The No Build bus routes are presented in Figure 2-5. Overall, the service improvements will change the existing system as indicated in Table 2-1.

Table 2-1. Summary of No Build METRO Service Characteristics

Element	2003	2025 No Build (estimate)
Fixed Routes by Service Type*	74 Local 8 Express 28 Park & Ride	84 Local 10 Express 37 Park & Ride
Bus Fleet Size	1,457 (including spares)	1,600 (including spares)
Annual Revenue Miles of Bus Service**	56.22 million	87.21 million
Annual Revenue Hours of Bus Service**	3.82 million	4.63 million
Light Rail Fleet Size	-	18
Annual Revenue Miles of Light Rail Service	-	836,290
Annual Revenue Hours of Light Rail Service	-	65,346

*Does not include employee shuttles and transit services operated by other entities. Does not count route branches as separate routes. All numbers are based on Year-to-Date figures as of January 2003. No growth was assumed for 2007.

**The 2025 estimates do not assume an increase in Special Bus Services from the 2003 levels and are annualized based on 300 operational days per year.

Source: METRO Scheduling Department, METRO Rail Operations Department, and METRO Capital Planning Department; December 2002; METRO Office of Management & Budget; January 2003.

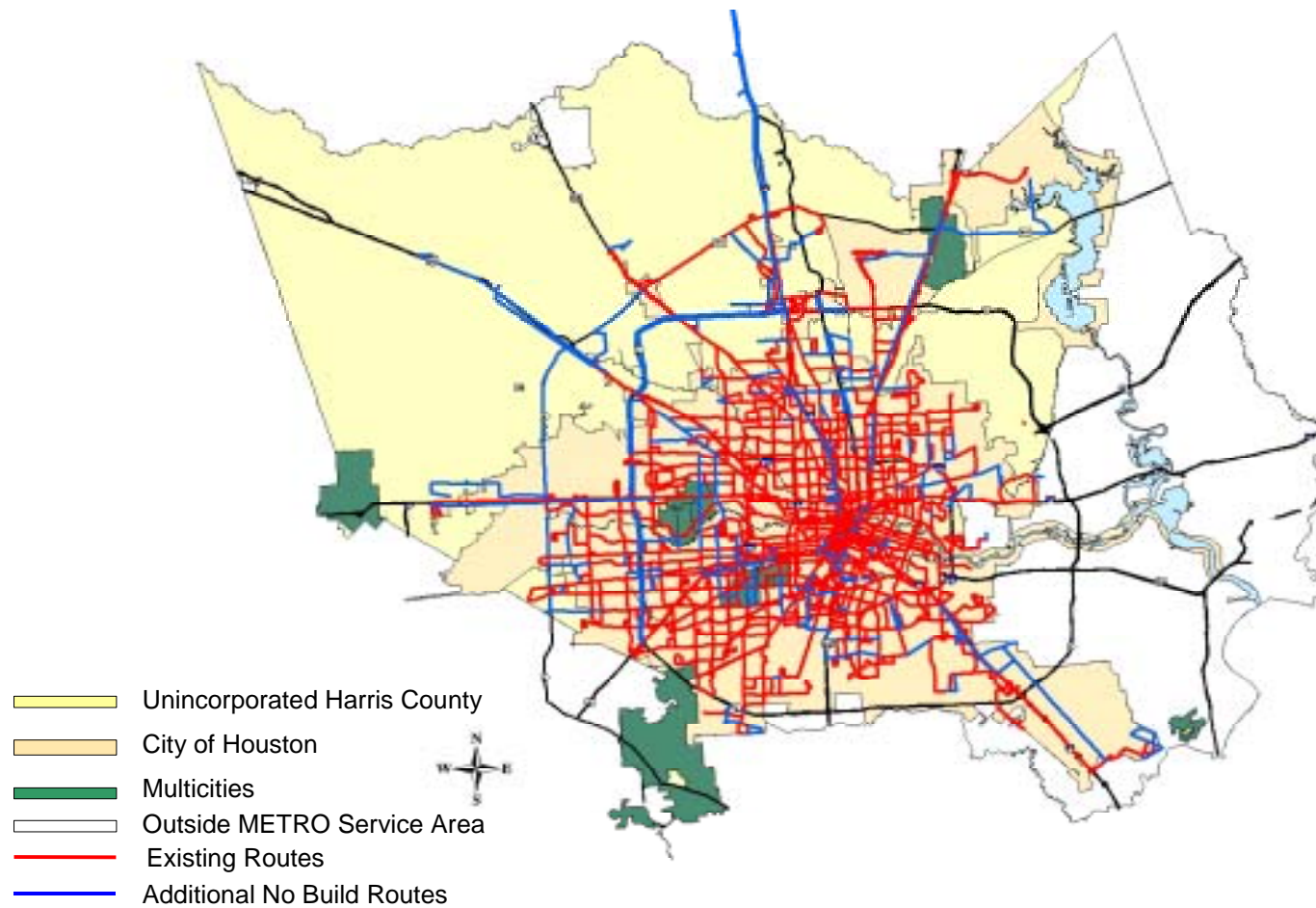
³ HOV lanes operate between 5:00am and 11:00am and between 2:00pm and 8:00pm weekdays. The HOV lanes on the Katy Freeway are operational on Saturday and Sunday as well.

⁴ METRO Office of Management & Budget Department, January 27, 2003.



Source: METRO Marketing & Communications 2003





Source: METRO Transit System Analysis, 03/20/03

Base Map, METRO GIS & Cartography



As a result of No Build service improvements, METRO's total annual transit boardings are expected to increase from 97 million in 2003 to approximately 160 million by 2025.

2.1.2 Existing METRO Capital Facilities and Programmed Improvements

METRO has constructed transit facilities, such as transit centers, Park & Ride lots, and storage and maintenance facilities, to support its current operations. In addition, METRO currently operates 107.4 lane miles of HOV that commuter routes and carpools/vanpools use.

To accommodate the increase in service levels assumed to occur by 2025, METRO will expand or increase the number of transit facilities as indicated in Table 2-2. No Build METRO Capital Facilities. Figure 2-6 identifies existing and programmed locations for METRO's Park & Ride lots and transit centers that are included in the No Build Alternative. Similarly, Figure 2-7 and Figure 2-8 indicate METRO's HOV system and the locations for METRO's maintenance and storage facility sites that are in the No Build Alternative, respectively. The site for METRO's planned sixth bus maintenance and storage facility has yet to be determined. A complete list of METRO's transit capital facilities that are included in the No Build Alternative is presented in Appendix B.

Table 2-2. No Build METRO Capital Facilities

Transit Facility	2003	2025 No Build
Bus Park & Ride Lots	25	29
Bus-only Transit Centers	15	19
HOV Lanes Used By METRO (Centerline Miles)	97.7 miles*	187 miles**
Light Rail Park & Ride Lots	0	1
Light Rail-Bus Transit Centers	0	2
Bus and Light Rail Storage and Maintenance Facilities	5 bus facilities	6 bus facilities 1 light rail facility
Other METRO Storage and Maintenance Facilities	1 non-revenue vehicle facility 1 central supply	1 non-revenue vehicle facility 1 central supply

Source: METRO Service Planning, December 17, 2002; 2025 No Build Transit Facilities, METRO Capital Planning.

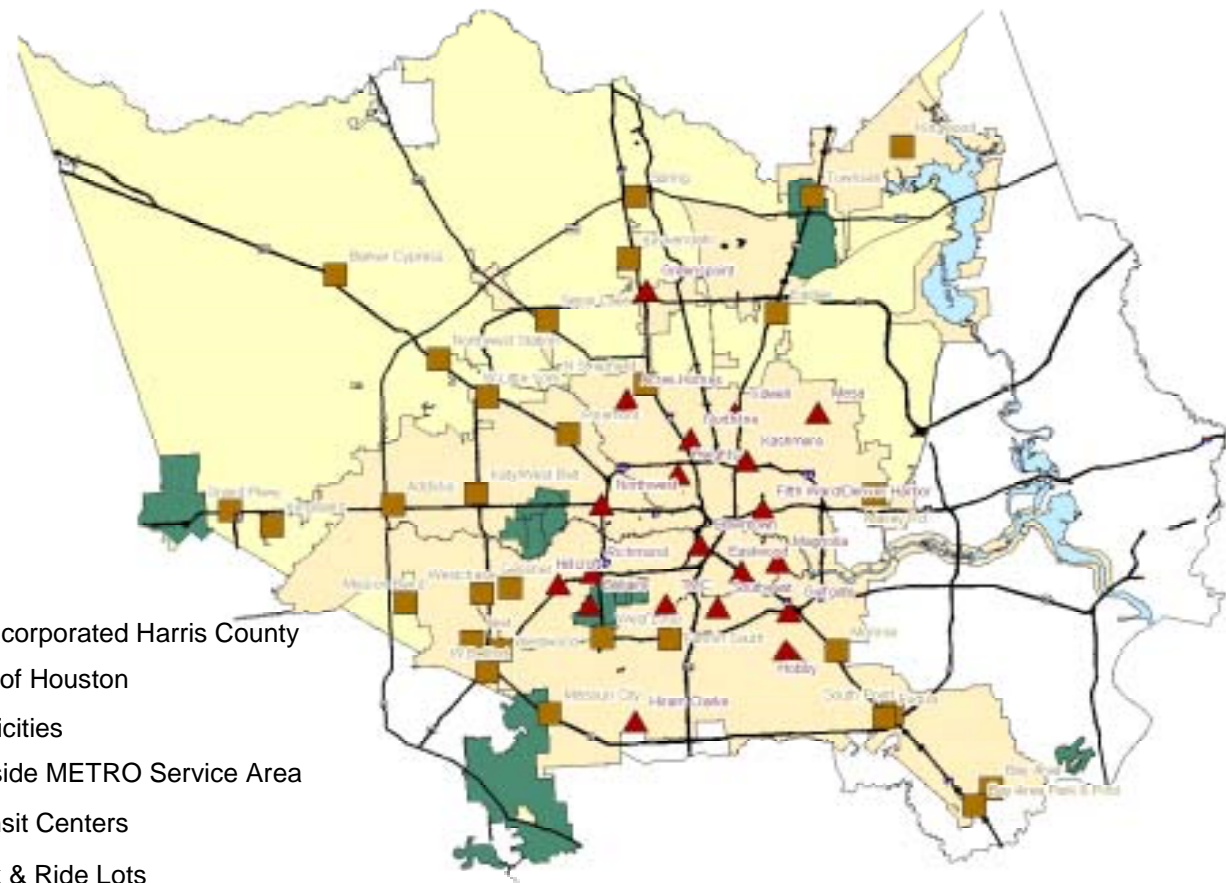
*Source: METRO Planning, Engineering & Construction, HOV Lane Program Status Report, 04/09/03.

**Generated from Houston METRO EMME/2 Travel Demand Model for No Build Scenario January 2003

2.1.3 Highway and Roadway Improvements

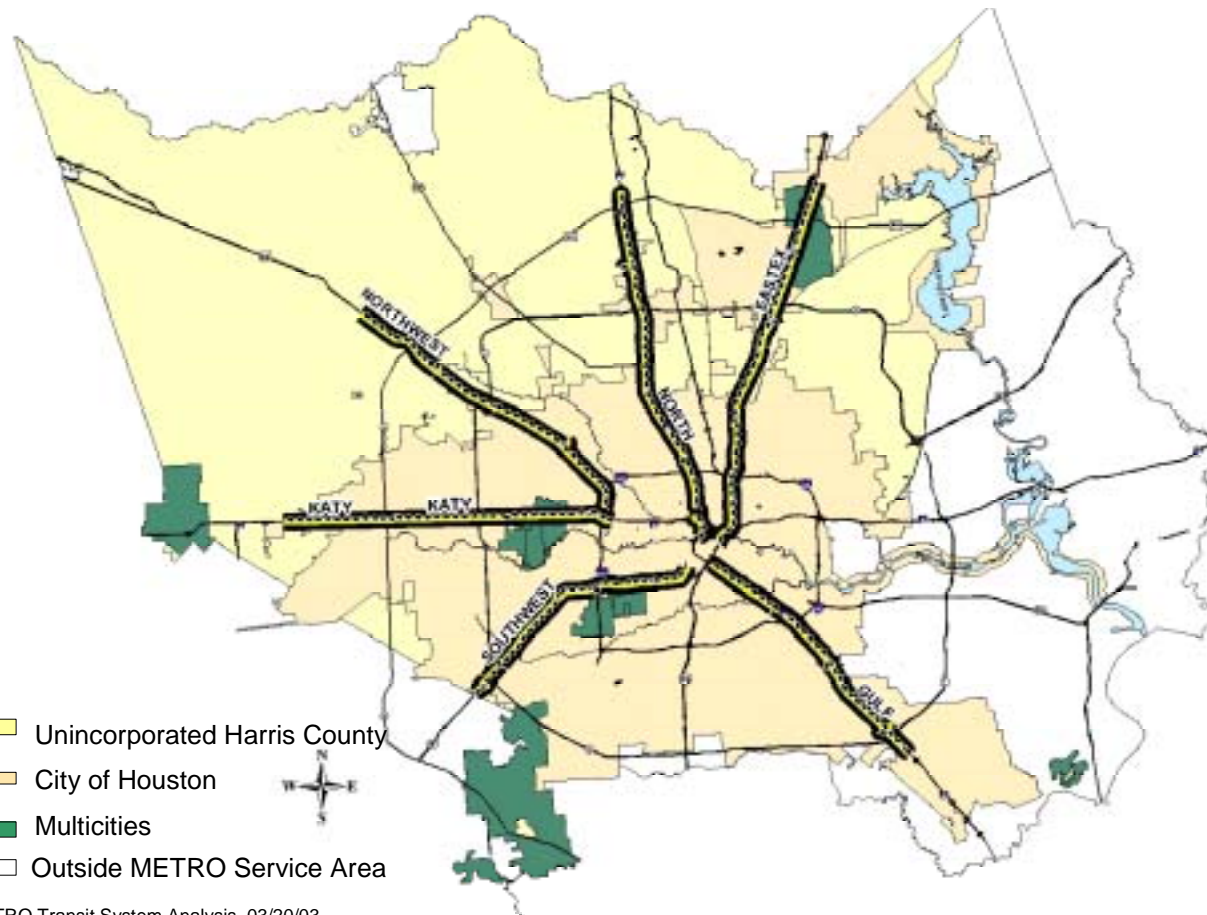
The regional highway and roadway system is comprised of interstate and other federal highways, state highways, county roads, toll roads, and arterial roadways in the eight-county metropolitan area. In 2000, the regional roadway system totaled over 20,000 lane miles of major highways and roads. In addition, the regional highway network incorporates a system of freeway HOV lanes, most of which have been constructed and are used by METRO.

The Level of Mobility (LOM) or the degree of congestion measure for roadways within the Houston-Galveston Transportation Management Area (TMA) is similar to the standard engineering Level of Service (LOS) criteria which ranges from LOS-A representing free-flow operating conditions to LOS-F representing gridlock. The LOM measure incorporates an evaluation capacity, which is usually higher than the design capacity to account for higher



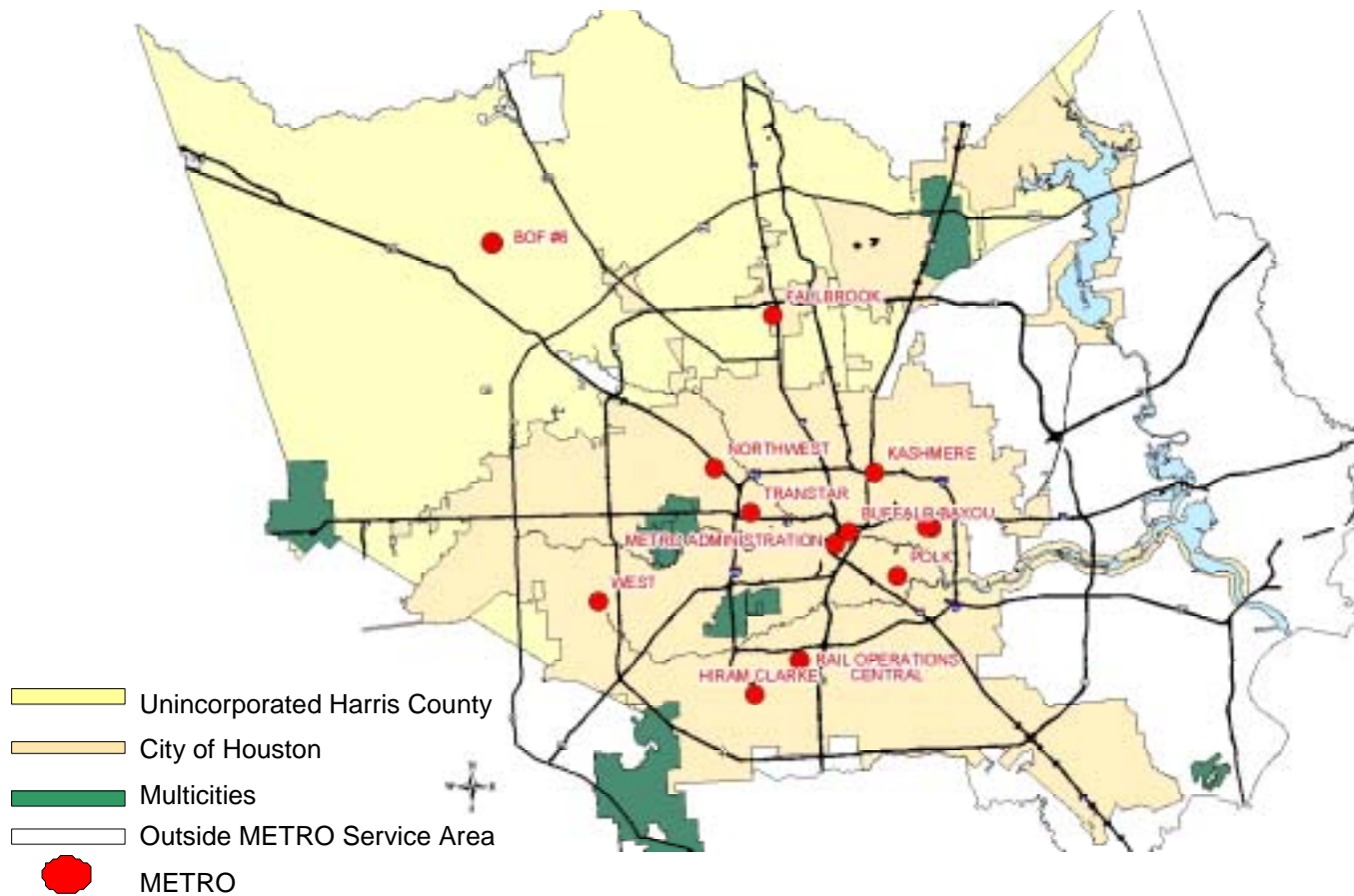
- Unincorporated Harris County
- City of Houston
- Multicities
- Outside METRO Service Area
- Transit Centers
- Park & Ride Lots

Source: METRO Transit System Analysis,
Base Map, METRO GIS & Cartography



- Unincorporated Harris County
- City of Houston
- Multicities
- Outside METRO Service Area

Source: METRO Transit System Analysis, 03/20/03
 Base Map, METRO GIS & Cartography



Source: METRO Transit System Analysis,
Base Map, METRO GIS & Cartography



than average traffic volumes. H-GAC's Transportation Department has developed criteria for determining the levels of mobility as shown in Table 2-3.

Table 2-3. Criteria for Levels of Mobility

Level of Mobility	V/C Ratio*
Tolerable	V/C less than 0.85
Moderate	V/C between 0.85 and 1.00
Serious	V/C between 1.00 and 1.25
Severe	V/C greater than 1.25

*The V/C ratio is the measure of roadway volume divided by roadway capacity. The dividend indicates the level of congestion. The closer the ratio is to 1.0, the more congested the roadway. At 1.0 or above, traffic is operating in stop-and-go conditions.

Source: H-GAC Transportation Department, 2/19/2003.

The following graphs (Figure 2-9) illustrate the daily and peak period LOM summaries by category for the current and future systems. The comparison is made between the Level of Mobility for 2000 and for 2022, with and without planned Metropolitan Transportation Plan (MTP) projects. The graphs show mobility levels deteriorating unless planned transportation improvements are implemented. (More detailed information pertaining to regional traffic congestion is presented in Appendix C.)

The planned roadway improvements include expansion of the regional roadway and HOV system. As indicated in Table 2-4, between 2000 and 2022, freeway lane miles will increase by 1,269 miles, but centerline miles (construction of new freeway segments) will increase by only 122 miles. The smaller growth in centerline miles is indicative of more freeway widening projects than construction of new freeways. The regional HOV system is also benefiting from the freeway widening projects. METRO will be operating 112 miles of HOV lanes in 2007, up from 89 miles available in 2000. The 2022 MTP, which includes 8 counties, envisions this expansion of the HOV system to continue over the next twenty years which will include diamond lanes and managed lanes. According to the 2022 MTP, the region will have 187 centerline miles of HOV completed by 2022, much of it in two-way operation (indicated by 316 lane miles in Table 2-4). Some of these proposed two-way HOV lanes were placeholder projects in METRO's 2022 long-range plan.

Table 2-4. No Build Regional Roadway Improvements Through 2022

Roadway Facility	2002		2022	
	Centerline Miles	Lane Miles	Centerline Miles	Lane Miles
Freeway	510	3,199	714	4,591
Tollway	87	443	139	744
Principal Arterial	1,149	4,485	1,371	5,873
Other Arterial	3,018	8,903	3,219	10,824
Collector	1,502	3,227	1,577	3,791
HOV Lanes	89*	90**	187	316

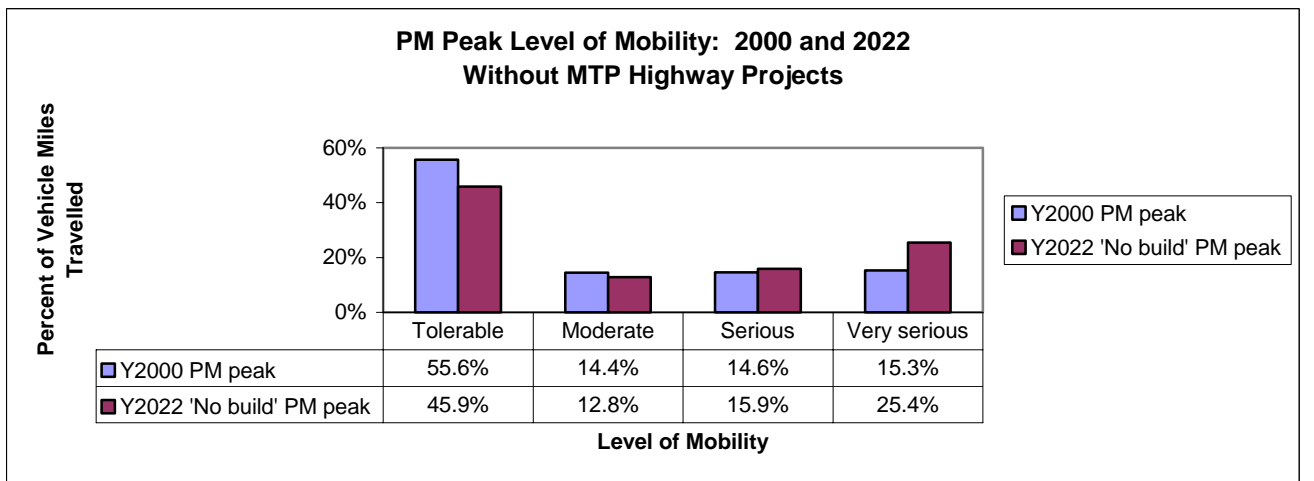
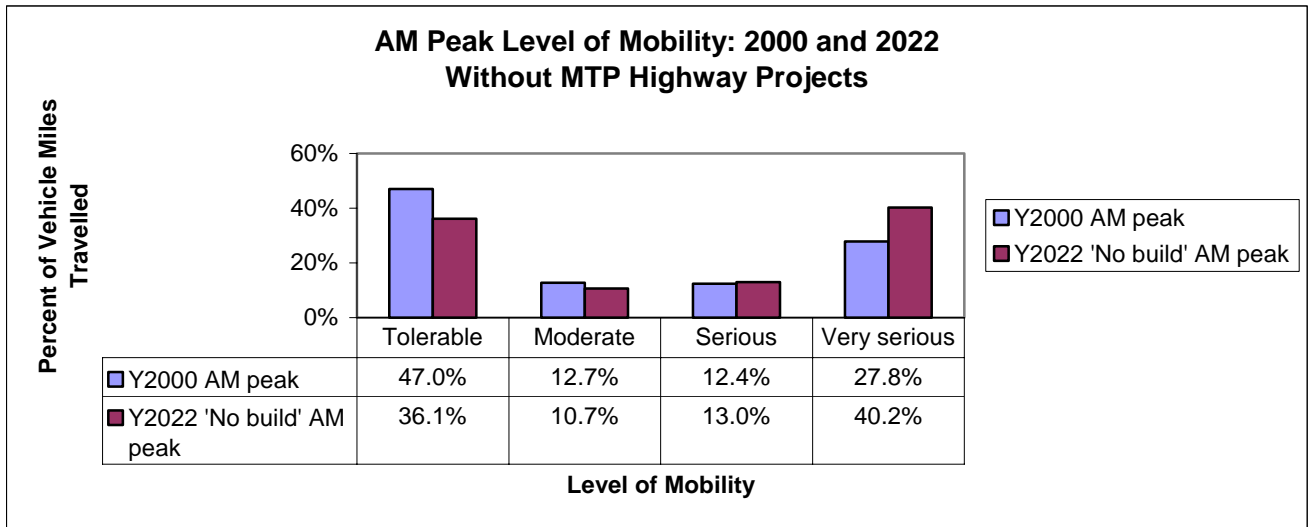
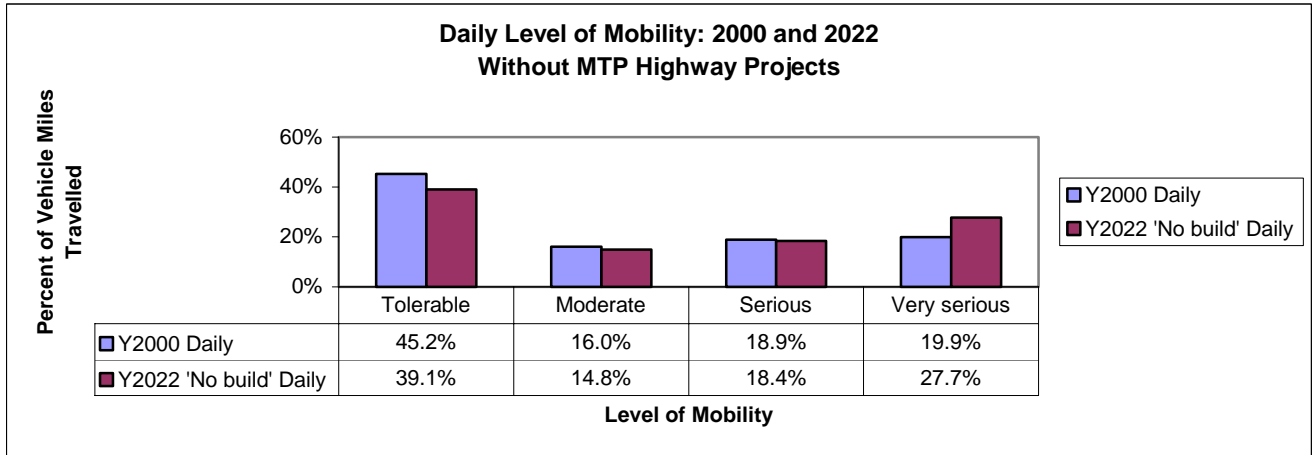
* Miles of HOV facilities

** Miles of HOV lanes, counting each lane separately, even if an HOV lane parallels another on the same roadway segment

Source: H-GAC 2022 Metropolitan Transportation Plan, 2000; H-GAC, 2/17/2003. (Includes 8 county region)

In addition, the arterial street system will undergo extensive improvements. Inside Beltway 8, where the road network is well established, the roadway improvements will focus on widening projects and projects to close the gaps in the existing roadway network. Outside Beltway 8, several new thoroughfares have been identified to accommodate growth primarily in the

Figure 2-9. Level of Mobility



Source: H-GAC, Transportation Department, 2/19/03.

northern and western sections of Harris County. In addition, TxDOT is planning to improve access to/from the regional freeway network. Supplementing the regional roadway network are toll roads and new toll lanes being constructed by the Harris County Toll Road Authority (HCTRA). Currently, HCTRA operates 87 centerline miles of toll roads and is constructing or planning to construct approximately 139 centerline miles of toll facilities, as indicated in Appendix D. The regional roadway improvements planned through 2022 are presented in Figure 2-10. Roadway improvements included in the No Build Alternative are identified in the Houston-Galveston Area Council (H-GAC) Metropolitan Transportation Plan (Adopted February 25, 2000).

2.1.4 Other Transportation Improvements

Within the Houston-Galveston region, combined bicycle and pedestrian trips account for approximately 2.6 percent of total work trips. There is a potential for bicycle and pedestrian travel to increase with adequate infrastructure. Currently there are approximately 160 miles of bicycle and pedestrian facilities (not including sidewalks), a significant amount found in "master planned communities." Existing plans call for construction of 391 miles of on- and off-road facilities. Once completed, this would provide over 500 miles of bicycle and pedestrian facilities (not including sidewalks) interlinked in a comprehensive, cohesive network. The Regional Bicycle and Pedestrian Plan identifies ways to implement and expand the planned 500+ mile network.

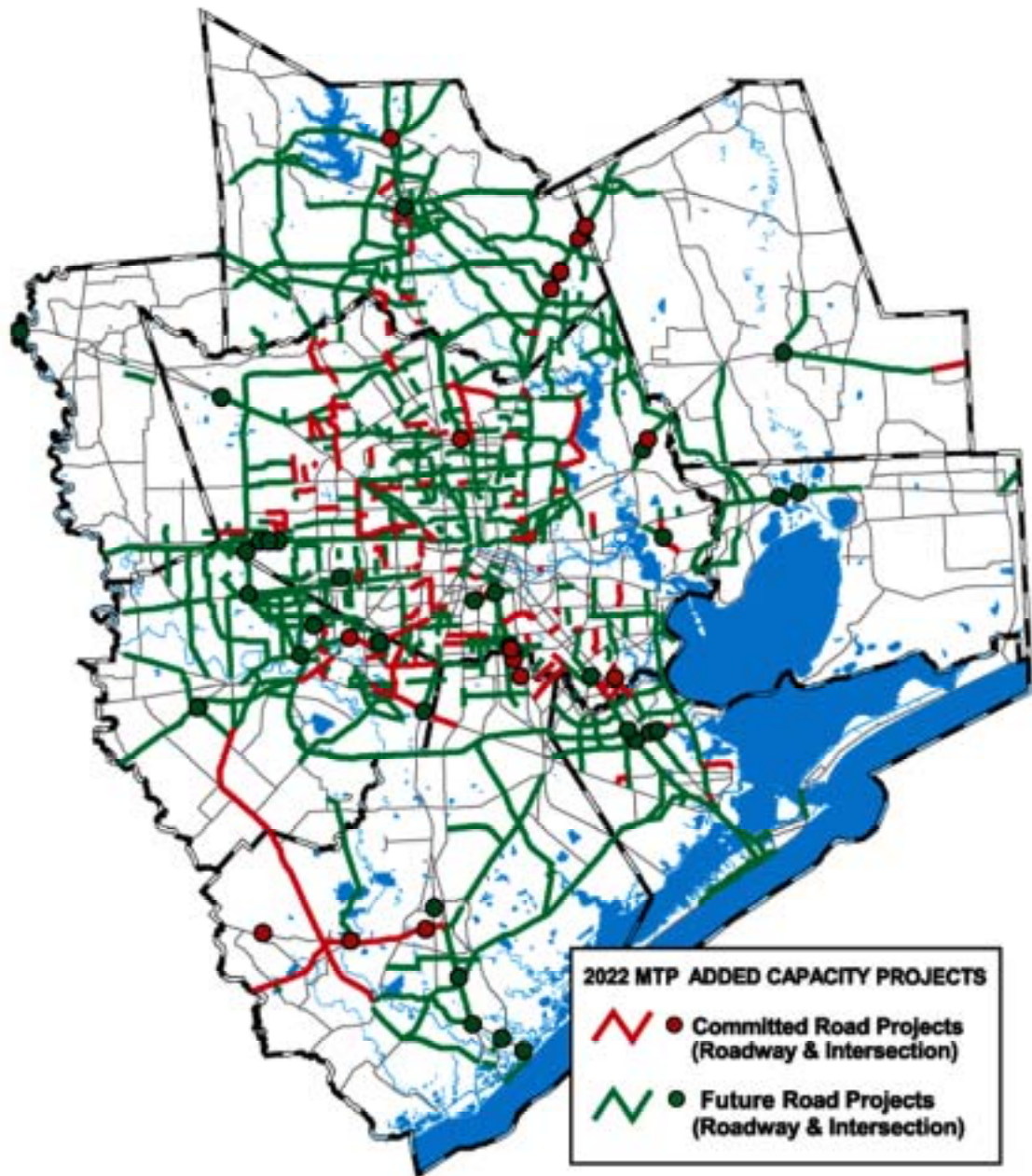
2.2 Developing the Long List of Possible Build Alternatives

2.2.1 Route Alignment Alternatives

The broad objective of AHCT for the Southeast-Universities-Hobby corridor is to tie the corridor into the regional network of AHCT and support transit services, with particular focus on activity centers within the corridor, which include downtown (inclusive of the Convention Center area), the universities (TSU and UH), and Hobby Airport. The AHCT route finally selected should serve these locations effectively, which requires that each is linked, either directly or by means of interconnections with other services, to the origins or destinations of people who use those activity centers. In addition it was repeatedly emphasized at public and stakeholder meetings that existing bus routes serving the Southeast-Universities-Hobby corridor provide inadequate connectivity to areas west of SH 288, particularly Midtown, the Texas Medical Center, and points beyond.

It is clear upon inspection of development patterns within and outside the corridor, and information regarding total and public transportation travel patterns, that a single AHCT alignment will not readily optimize all the linkages being addressed. An optimal link between downtown and Hobby Airport, for example, would bypass most of the corridor, and would have few stops in order to achieve the best possible average speed between those two end points. Optimal service to the universities might include the airport as an end point, but would also link the universities to the population within the corridor, and to more than one connection with the regional network. Evidence from passenger travel using the existing bus system indicates that the number of people who travel to and from the universities is greater to and from the south than to and from Downtown.

With respect to Hobby Airport in particular, it was recognized that most AHCT-type routes to airports in major US cities are more productive as links between employment at the airport and employees' places of residence than as links between air travelers and their local origins or destinations. Recognizing such issues, it was concluded that service to residential areas within the corridor is an essential component of the linkages likely to produce a successful AHCT route; an "express" route connecting only to the major activity centers would almost certainly be less viable.



Source: HGAC Transportation Department, 2003



With this in mind, the search for route alternatives began with selection of virtually all evident rights of way in which LRT or BRT might be introduced, including arterial streets and active or abandoned railroads. Upon creation of that map, a preliminary level of screening revealed sufficient reasons to discard some of the route segments that were initially indicated for consideration. Review and discussion with the public confirmed these observations and resulted in the dropping of some additional segments. Figure 2-11 provides the map of the long list route segments, including indication of segments that were discarded, and the reasons for dropping them.

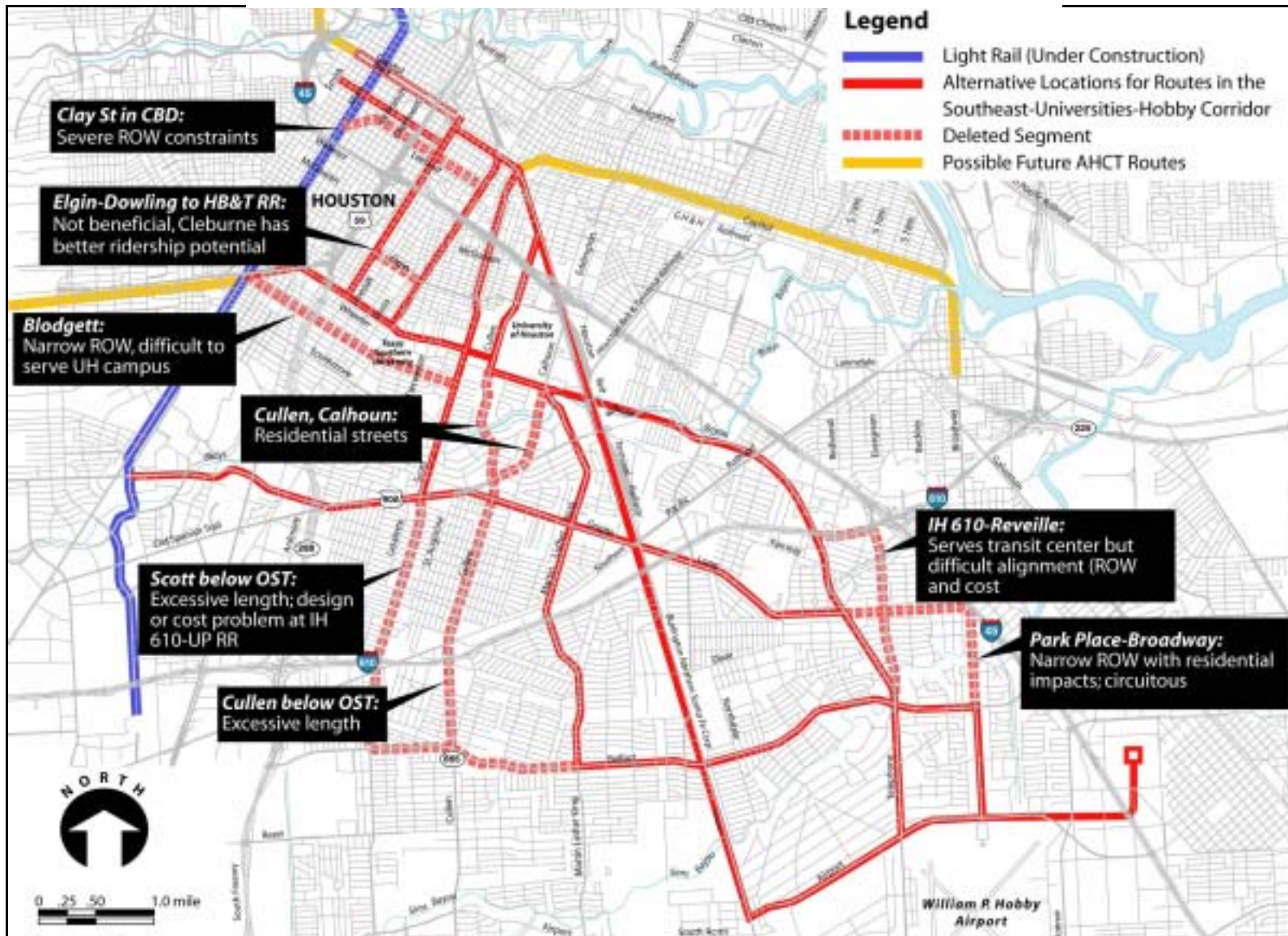
From inspection of the map of the remaining route segments, it is immediately apparent that a very large number of alternatives would be necessary to exhaust all possible combinations of the segments. Furthermore, any effort to compare the resulting whole alternatives would be very difficult, since each would have a broad mixture of strengths and weaknesses. For this reason, the screening process was applied to route segments within subdivisions of the corridor. Three intra-corridor "Sectors" were selected and are illustrated in Figure 2-12. As shown in the Figure, there are a number of route alternatives within each Sector. Sector 2 poses the most complex situation, because it contains an alternative segment that traverses the entire Sector (the extension from Wheeler eastward to Telephone Road) but also various shorter segments that must be combined to reach from boundary to boundary. This was dealt with by subdividing the Sector into two parts, 2a and 2b, along Griggs at Martin Luther King and at Mykawa. An exception to the sector approach was made in the case of the "express link", which would be a stand-alone segment extending from the corner of the UH campus in Sector 1 to near Hobby Airport in Sector 3.

A "Regional Connectivity Sector" (Sector R) was also defined, to encompass segments that provide alternative connections to the regional AHCT network (all connecting with the Downtown to Reliant Park light rail line). These segments extend into the Downtown area, to Midtown at the Wheeler Light Rail Station, and to the Texas Medical Center at the TMC Transit Center Station. Possible downtown routings were not resolved at this stage, being subject to issues such as future connection to the Inner Katy corridor to the northeast, resolution of adequate solutions for passenger interchange with other downtown AHCT route(s), service to activity centers in the southeastern portion of downtown, and limitations posed by streets closed off by US 59, the Convention Center, Minute Maid Park, and the new Multi-Purpose Arena

2.2.2 Technologies to be Considered

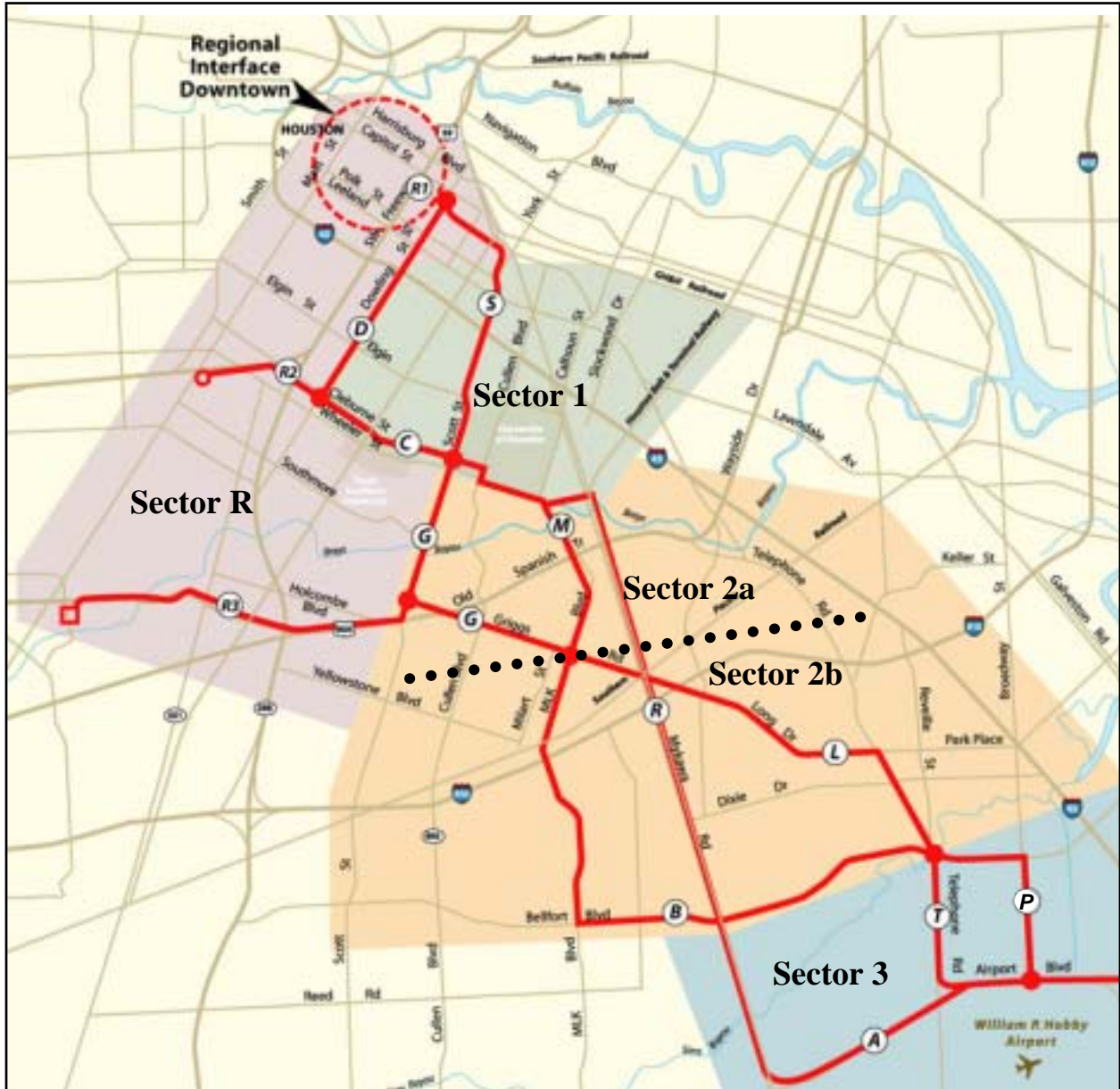
This study addresses the potential for introduction of AHCT in the Southeast-Universities-Hobby Corridor of the Houston METRO service area. AHCT is defined as a corridor transit facility that provides high-capacity, high-speed, two-direction, near all-day transit service. The technology may be any of a variety of vehicle and guideway forms intended to attract greater use of public transportation, improve the level of service of the overall transportation system, contribute to better air quality, and provide ample capacity to meet growing travel demand. By this definition, the single-lane reversible HOV lanes widely used in the Houston area are not in themselves AHCT facilities, because they lack the ability to carry transit and High-Occupancy Vehicles (HOVs) in both directions throughout the day.

In a technology assessment technical memorandum, a number of transit modes (technologies) were evaluated in the context of the nature of public transportation travel that may be served by AHCT in the Southeast-Universities-Hobby corridor. Table 2-5 provides a brief summary of this evaluation.



[Source: Parsons Brinckerhoff]





Source: Parsons Brinckerhoff



Table 2-5. Summary of Advanced High Capacity Transit Options Evaluated for the Southeast-Universities-Hobby Corridor

Transit Technology	Description
Local Bus	Bus route operating in streets in mixed traffic, with frequent stops
Bus rapid transit (BRT)	Advanced-technology bus operating in reserved lanes or separate right of way, with stations providing limited stops and off-vehicle fare collection
Light rail transit (LRT)	Light rail vehicle operating in reserved lanes or separate right of way, with stations providing limited stops and off-vehicle fare collection
Heavy rail rapid transit:	Trains of self-propelled rail cars operating in exclusive right of way, with stations providing limited stops and off-vehicle fare collection
Conventional commuter rail:	Trains of locomotive-hauled or self-propelled rail cars operating over conventional railroads, with widely-spaced stops
Light commuter rail:	Single or multiple-unit self-propelled light rail vehicles (usually diesel powered), operating over conventional railroads
High speed rail:	Advanced rail trains capable of very high speeds; very widely-spaced stops
AGT ¹ – Automated People Mover:	Individual or multi-unit self-propelled automated guideway vehicles on exclusive right of way with no fare or off-vehicle fare collection
AGT – Personal Rapid Transit:	Small automated vehicles on exclusive right of way, usually with passenger-selected stopping
Heavy monorail:	Large fixed-consist trains operating on a monobeam grade-separated exclusive guideway
Light monorail:	Small fixed-consist trains operating on a monobeam grade-separated exclusive guideway
Maglev (magnetic levitation):	Single or multiple-unit self-propelled guideway vehicles supported and propelled magnetically

¹ Automated Guideway Transit

2.3 Screening the Long List of Build Alternatives Process

For purposes of screening, preliminary information was gathered in support of each of the technical areas, these being Demand, Design, Development, and Environment, as previously explained and shown in Table 1-8.

2.3.1 Demand

Available data indicating passenger demand potential included forecasts of the geographic distribution of total person trips extending as far as 20 years into the future (METRO from H-GAC data), and documentation of current public transportation ridership within the corridor and to or from other locations within the METRO service area. These data are described and illustrated in the Purpose and Need report for the Southeast-Universities-Hobby Planning Study. Total person-trip patterns include substantial intra-corridor travel in all directions, but are dominated by north-south intra-corridor travel. They also indicate a major trip flow to and from the Houston Central Business District (CBD), but even larger volumes to and from both east and west of the corridor; there are only minor trip flows to and from the south. Travel to and from the CBD is concentrated, owing to the shape of the corridor, which is triangular with its apex at the CBD. The east-west travel that crosses the study area boundaries, though large in total, is widely dispersed both within and outside the study area. The largest concentrations of trip origins and destinations within the corridor occur at the university campuses.

The distribution of public transportation travel is broadly similar, but with significant differences. Within the corridor, transit passengers are heavily concentrated within the area west of the BNSF railroad. There is some concentration of transit use north of Hobby Airport, along Broadway, but the quantity is much smaller than is seen to the west. Hobby Airport

itself is a minor focus of transit passenger trips. It is largely employees at the airport, and not air travelers, using public transit to access the facilities and jobs at Hobby. The universities area is very prominent as the site of the largest numbers of transit trip origins and destinations. Interestingly, trips to and from the universities are more strongly oriented to the south than toward the CBD. Large numbers of passenger transfers occur where crosstown and radial routes cross one another, especially along Bellfort.

Public transportation travel between the study area and the area east of the Gulf Freeway is sparse, but there are large numbers of trips to and from the METRO service area west of SH 288. As in the case of total person trips, however, these east-west trips are dispersed within and outside the study area. Consequently the largest concentration of trips is oriented north-south, with a major end point at the Houston CBD. Actual passenger routing, due to the design of the METRO bus services, is more strongly oriented toward the CBD than would be found if everyone could travel by a direct path from origin to destination.

The implications of these travel characteristics in screening AHCT route alternatives include the following main points:

- Connection between the corridor and the CBD is likely to be better than connection to the regional network elsewhere, but improved east-west connections (e.g., to Midtown and to the Texas Medical Center) could be productive as well.
- Connection of the universities area to the residential areas and crosstown bus routes to the south is very important.
- Major transit improvement will be needed to achieve substantial use of transit for travel to and from Hobby Airport.
- It may be logical to link Hobby Airport with residences of airport employees; this may be a larger market than the air traveler market.
- Along with an AHCT connection to the CBD, the transit service connections to the TMC Transit Center and Wheeler light rail station will need to be improved, including consideration of AHCT links to these locations.

2.3.2 Design

The potential route segments were visually inspected to assess the adequacy of existing right of way and to note significant alignment problems such as points at which freeways or railroads crossed the right-of-way or the roadway was discontinuous, and bayou crossings. A generalized review of traffic conditions was made, to identify locations where the introduction of AHCT might result in significant degradation of traffic conditions. The quality of the alignment possible within each alternative route segment was considered, recognizing the potential effects on trip times and the cost of operating and maintaining AHCT.

2.3.3 Development

There is strong interest in economic revitalization and economic development within the corridor, balanced with preservation of existing neighborhoods. For this reason, the potential for revitalization and new development related to possible AHCT station locations was investigated. Current inventories of multi-family, retail and office space for the study area were tabulated by zip code area, and by year of construction or renovation. Building permit data for the last ten years were obtained and similarly summarized. Real estate brokers were interviewed to gain insights regarding present and likely future attractiveness of the study area for future residential and commercial development, including specific areas of greatest interest. Land use and aerial photography mapping was studied, in context with field

investigations of potential AHCT station locations. Other interviews were conducted to obtain specific information about ongoing residential and commercial development within the study area. Selected specific areas of potential development were investigated to determine amounts of land susceptible to development or redevelopment, given the catalyst effect of AHCT stations. Based on land availability, approximations of amounts of potential development were calculated. From these results, in which 31 potential station sites were investigated, eleven were found to have fair, good, or excellent development potential. The eleven locations are identified in Figure 2-13.

2.3.4 Environment

Protection and enhancement of the natural and built environment is a vital aspect of the improvement of public transportation within the corridor, and especially important in the identification and design of an AHCT route. Environmental screening was accomplished at the sector level for each route segment, with the results shown in Table 2-6. Noise and vibration were not considered in this screening phase of the study, but the short-listed alternatives were evaluated for noise and vibration effects.

2.3.5 Evaluation Results

The screening evaluations within each of the technical areas considered were compiled in Table 2-7. In the table, numeric values are attributed to the "+", "o", and "-" ratings: +1 for "+", 0 for "o", and -1 for "-". These values have been added together to obtain a composite score for each route segment. Based on the individual ratings and summed score for each route segment, the technical evaluation team drew their conclusions, as indicated in Table 2-7. The table includes a column called "Public" to emphasize that the evaluation is incomplete without public input.

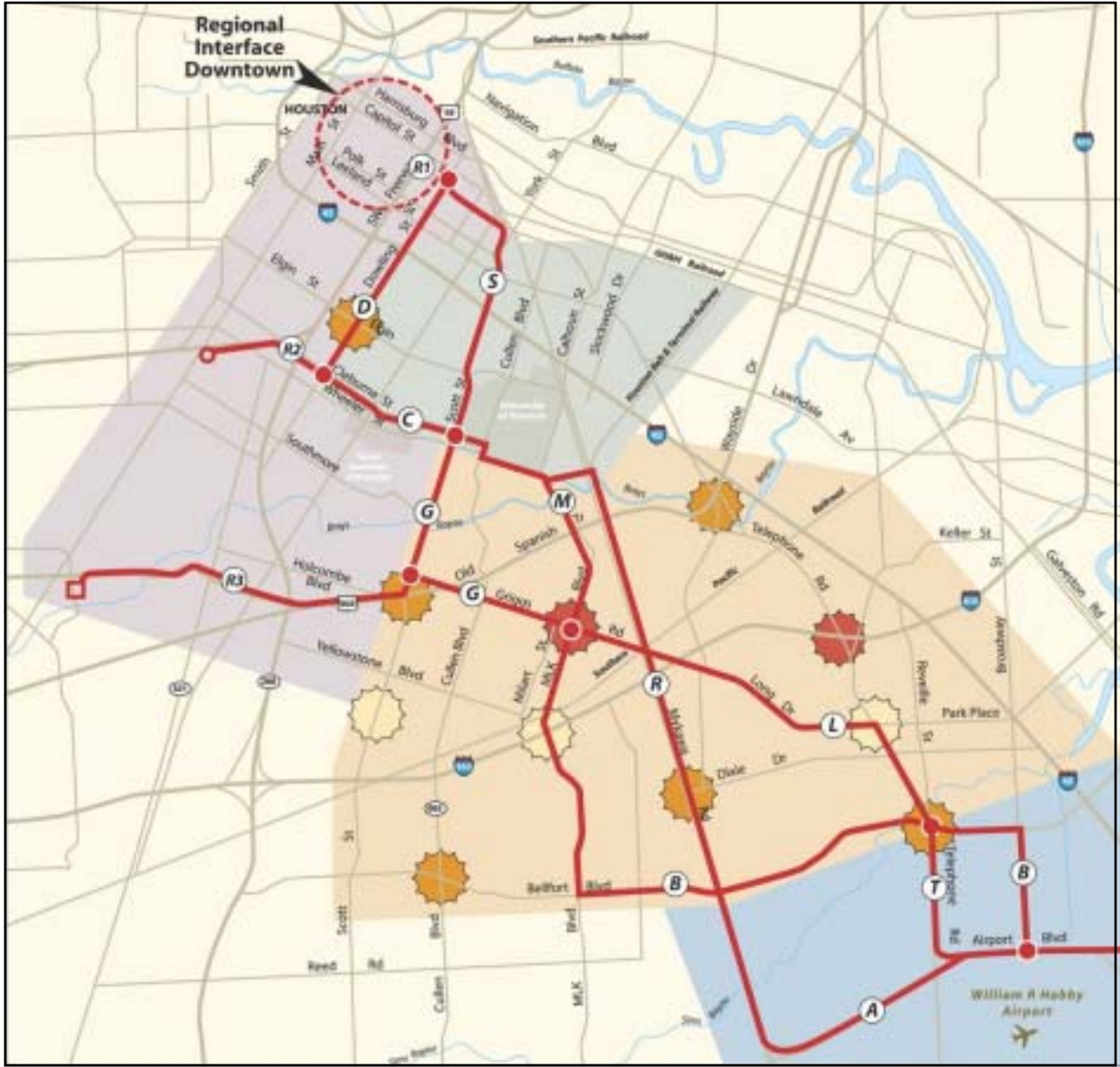
As noted in the discussion of the Sectors, the Long List also includes segments connecting to Downtown and other "Regional Connectivity" options. Their evaluation will be accomplished by the detailed study of the Short List of Alternatives.

These screening results were taken to the Community Involvement Committee (CIC) and reviewed in detail. Working interactively with the CIC, the consultant team made adjustments to the evaluation scoring and conclusions based on views of Committee members. The resulting matrix is as shown in Table 2-8.

As shown, the screening process concluded that the following route segments should be dropped:

Sector 1

- HB&T RR (abandoned railroad right of way) – conflicts with residential property; would have to share right of way with committed plan for a hike and bike trail.
- Cullen – conflicts with University of Houston objectives for reduced traffic role for the portion of Cullen that passes through the University campus; not well situated to serve the TSU campus.
- BNSF RR (adjacent to or within active railroad right of way) – does not allow convenient service to the universities, especially Texas Southern University.



Source: CDS Market Research for Parsons Brinckerhoff

Table 2-6. Initial Alternatives: Environmental Screening by Sectors

Segments	Parks	Historic	Superfund, Radioactive Waste/ Landfill Sites	Flood Plain - 100 Year	Bayous, etc.	Visually Sensitive Resources
Sector 1						
Dawling	<i>Emancipation Park:</i> Alignment adjacent to eastern park boundary along Dawling - approx. 750'	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
HB&T RR	<i>Sm.Park (Aulis & Nettleton):</i> Entirely within buffer area.	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
Scott	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
Cullen	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
BNSF RR	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
Sector 2-a						
Scott, Griggs to MLK	<i>Brays Bayou Pike & Bike Trail:</i> Alignment intersects along Scott; approx. 300'. Buffer area extends 1,000' in each direction.	No Impacts	No Impacts	Alignment crosses floodplain along Scott from N MacGregor Way to S MacGregor Way; approx. 400'	Alignment crosses Brays Bayou along Scott; approx. 40'	No Impacts
MLK from Wheeler - Griggs	<i>MacGregor Park:</i> Alignment crosses park along M.L. King Blv.; approx. 2,200'	No Impacts	No Impacts	Alignment crosses floodplain along M.L. King Blv. from Brays Bayou to Mid-way through MacGregor Park; approx. 1,200'	Alignment crosses Brays Bayou along M.L. King Blv.; approx. 40'	<i>MacGregor Park:</i> Alignment crosses park along M.L. King Blv. - approx. 2,200'; and <i>ML. King Blvd.:</i> From MacGregor Park to Griggs - approx. 6,900'
BNSF RR to Griggs	<i>MacGregor Park:</i> Alignment runs on eastern boundary along RR line (B.N.S.F.); approx. 1,500'. Buffer extends into park approx. 300'	No Impacts	No Impacts	Alignment crosses floodplain at Brays Bayou along RR right of way - approx. 500'; and, crosses floodplain at Sunrise along RR right of way - approx. 120'	Alignment crosses Brays Bayou along RR right of way - approx. 40'	<i>MacGregor Park:</i> Alignment abuts east boundary - approx. 1,500'
Sector 2-b						
Griggs - Long to Telephone	<i>Park by Barrett Stadium:</i> Alignment runs along boundary approx. 1,700'; buffer extends into park approx. 500'	No Impacts	No Impacts	Alignment adjacent floodplain at Griggs & Telephone Rd. - approx. 50'	No Impacts	No Impacts
MLK - Bellfort to Telephone	<i>Edgewood Park:</i> Entirely within buffer area; Alignment abuts south boundary of park along Bellfort at Southbank - approx. 700'; and, <i>Sm.Park (St. Lo & Pershing):</i> Entirely within buffer area.	No Impacts	No Impacts	Alignment adjacent floodplain along Bellfort from Crestmont to RR (BNSF) - approx. 3,800'; Alignment adjacent to floodplain at Bellfort and Nunn - approx. 500'; and, Alignment crosses floodplain along Bellfort from Hemingway to Telephone - approx. 4,200'	Alignment crosses Sims Bayou near Telephone Rd. - approx. 40'	<i>ML. King Blvd.:</i> From Griggs to Bellfort - approx. 8,100'; and, <i>Bellfort:</i> From M.L. King Blv. to Telephone - approx. 15,300'
BNSF - Bellfort to Telephone	No Impacts	No Impacts	No Impacts	Alignment crosses floodplain on RR right of way from Bellfort to Belarbar - approx. 300'	No Impacts	No Impacts
Sector 2- a & b						
Telephone from Wheeler	<i>MacGregor Park:</i> Buffer area crosses northern section of park along Brays Bayou - approx. 2,000'; and, <i>Fonds Park:</i> Buffer intersects Pk. - approx. 300'; and, <i>Park</i> adjacent S. Wayside Dr. & Brays Bayou is mostly within buffer area.	No Impacts	No Impacts	Alignment crosses floodplain on undeveloped right of way along Wheeler from Calhoun to Beatty; Total approx. 8,000' w/ undeveloped row approx. 6,150'; Alignment adjacent to floodplain along Telephone Rd. from I610 to Long Dr. - approx. 3,200'; and, Alignment crosses floodplain along Telephone Rd. from Starwick to Pecan Villas - approx. 2,000'	Alignment crosses Brays Bayou two (2) separate times near RR right of way (BNSF) - approx. 40'; crosses Brays Bayou near Fonds Park - approx. 40'; and, crosses Sims Bayou along Telephone Rd. - approx. 40'	No Impacts
Sector 3						
Bellfort - Broadway	No Impacts	No Impacts	No Impacts	Alignment crosses floodplain along Bellfort from Telephone to Leona - approx. 1,250'	No Impacts	<i>Bellfort:</i> From Telephone to Broadway - approx. 3,700'; and, <i>Broadway:</i> From Bellfort to Airport Dr. - approx. 5,100'
Telephone - Airport	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
BNSF - Airport	No Impacts	No Impacts	No Impacts	Alignment crosses floodplain on RR right of way from Houndel to Evans Dr. - approx. 3,500'	Alignment crosses Sims Bayou along RR right of way - approx. 40'	No Impacts

Table 2-7. Screening Evaluation Matrix for the Long List of AHCT Route Alternatives:
Technical Team Results

Sector	Alternative	Demand	Design	Development	Environment	Public	Score	Drop
1	Dowling	+	o	+	+	TBD	3.0	
	HB&T RR	+	+	-	-	TBD	0.0	x
	Scott	+	o	o+	o	TBD	1.5	
	Cullen	+	o	o+	o	TBD	1.5	
	BNSF RR	-	-	-	+	TBD	-2.0	x
2a	Scott, Griggs to MLK	+	+	+	o	TBD	3.0	
	MLK-Bellfort between Wheeler-Griggs	+	o	o+	-	TBD	0.5	
	BNSF to Griggs	-	-	o+	o	TBD	-1.5	x
2b	Griggs-Long to Telephone	o	+	+	o	TBD	2.0	
	MLK-Bellfort to Telephone	+	+	o+	o	TBD	2.5	
	BNSF-Bellfort to Telephone	o	-	-	o	TBD	-2.0	x
2a and b	Telephone from Wheeler	o	o	+	-	TBD	0.0	x
3	Bellfort-Broadway	+	+	o	-	TBD	1.0	
	Telephone-Airport	o	o	+	o	TBD	1.0	
	BNSF-Airport	-	-	-	o	TBD	-3.0	x

Table 2-8. Screening Evaluation Matrix for the Long List of AHCT Route Alternatives:
Results Including Community Issues Committee Views

Sector	Alternative	Demand	Design	Development	Environment	Score	Drop
1	Dowling	+	o	+	+	3.0	
	HB&T RR	+	+	-	-	0.0	x
	Scott	+	o	o+	+	2.5	
	Cullen	+	o	o+	-	1.0	x
	BNSF RR	-	-	-	+	-2.0	x
2a	Scott, Griggs to MLK	+	+	+	o	3.0	
	MLK-Bellfort between Wheeler-Griggs	+	o	o+	-	0.5	
	BNSF to Griggs	-	-	o+	o	-1.5	x
2b	Griggs-Long to Telephone	o	+	+	o	2.0	
	MLK-Bellfort to Telephone	+	+	o+	o	2.5	
	BNSF-Bellfort to Telephone	o	-	-	o	-2.0	x
2a and b	Telephone from Wheeler	o	o	+	-	0.0	x
3	Bellfort-Broadway	+	+	o	-	1.0	
	Telephone-Airport	o	o	+	o	1.0	
	BNSF-Airport	-	-	-	o	-3.0	x

Sector 2a

- BNSF RR, Wheeler to Griggs – cost or alignment issues to obtain adequate right of way, little ridership potential.

Sector 2b

- BNSF RR – Griggs to Bellfort – cost or alignment issues to obtain adequate right of way, little ridership potential.

Sector 2a&b

- Telephone, Wheeler to Bellfort – absence of ridership and design advantages; environmental issues including flood plain and residential area conflicts in vicinity of Brays Bayou.

Sector 3

- BNSF RR – Bellfort to Airport Boulevard – cost or alignment issues to obtain adequate right of way, little ridership potential.

These screening results were subsequently presented at two public meetings, which were in “open house” format and included a presentation with a question and answer period.

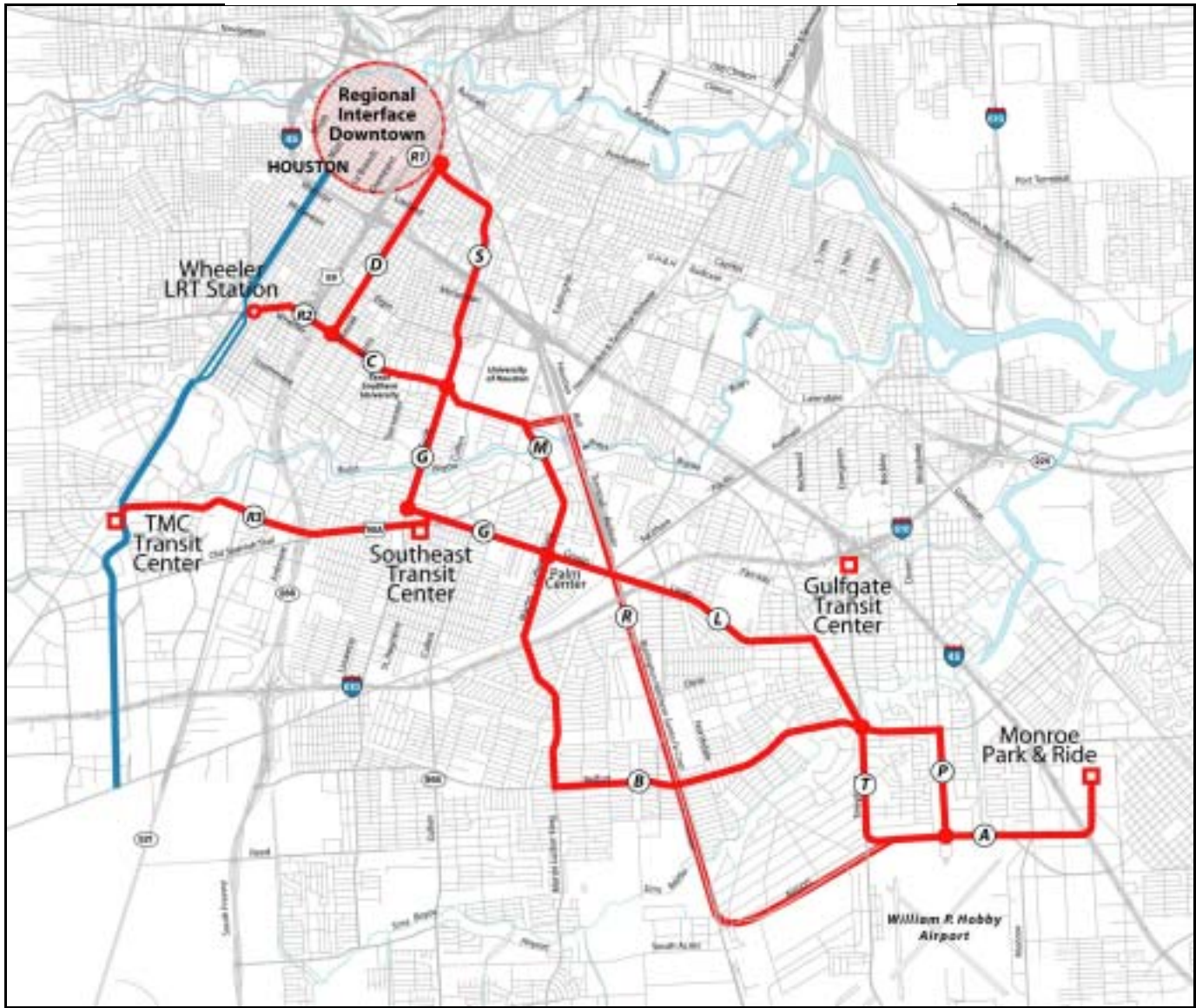
Specific comment was received expressing the view that an alternative achieving optimal travel time between Hobby Airport and downtown Houston should be included, and suggested use of the BNSF alignment for that purpose. Consequently, despite the negative factors seen in the screening-level evaluation, BNSF segments in Sectors 2 and 3 were restored to the short list.

2.4 Results of Screening

2.4.1 Alignments

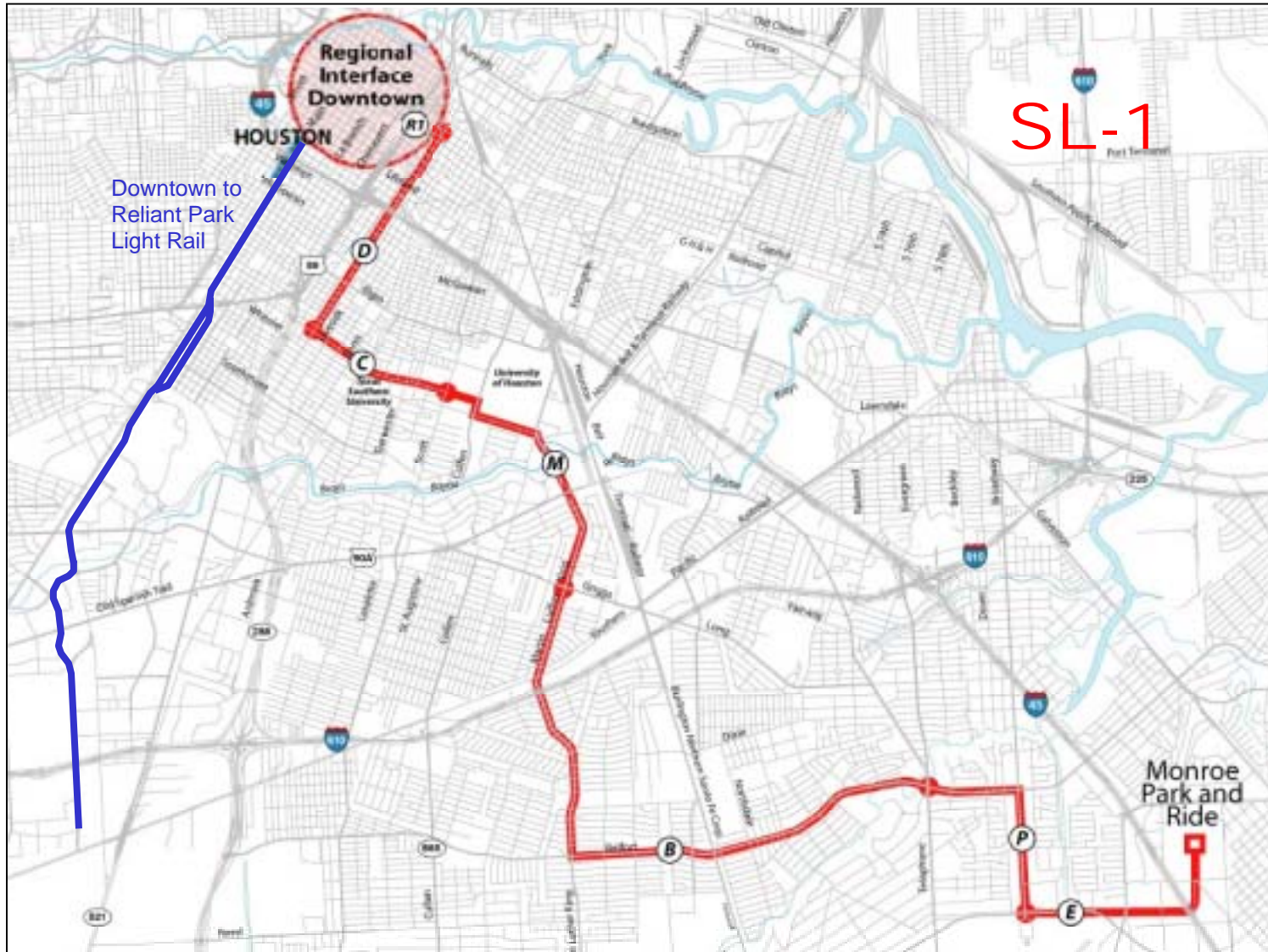
The screening process left a reduced set of route segments to be considered, as intended. The surviving route segments were compiled on a single map provided as Figure 2-14. These remaining route segments still provide a number of potential alignment options in each sector. There are two remaining route choices within the area evaluated as Sector 1, three within Sector 2a, three within Sector 2b, and three within Sector 3. In addition, three Regional Connectivity routes, all intended to connect with the Downtown to Reliant Park light rail line, are shown – one to Downtown, one to the Wheeler light rail station, and one to the Texas Medical Center Transit Center. Preferred routings for these potential connections are to be determined later, in context with other aspects of their evaluation including a final choice as to which will be carried forward as the Locally Preferred Investment Strategy. Recommendations of the study will include modifications or additions to the bus routes serving the Southeast-Universities-Hobby area, which may entail the introduction of new routes that augment AHCT’s connection to the regional network.

Four alternatives are defined for purposes of detailed evaluation. The evaluation will be constructed to provide Sector-level detail as well as overall route results, to support final choices between “either – or” route segments, which are somewhat arbitrarily pieced together to form three of the four route alternatives. The fourth alternative is designed to test a route that primarily connects downtown, the universities, and Hobby Airport while seeking to minimize downtown to Hobby travel time. These route alternatives are shown in Figure 2-15 through Figure 2-18, below. Alternative SL-2 will be analyzed both with and without the segment connecting to the TMC Transit Center.



[Source: Parsons Brinckerhoff]

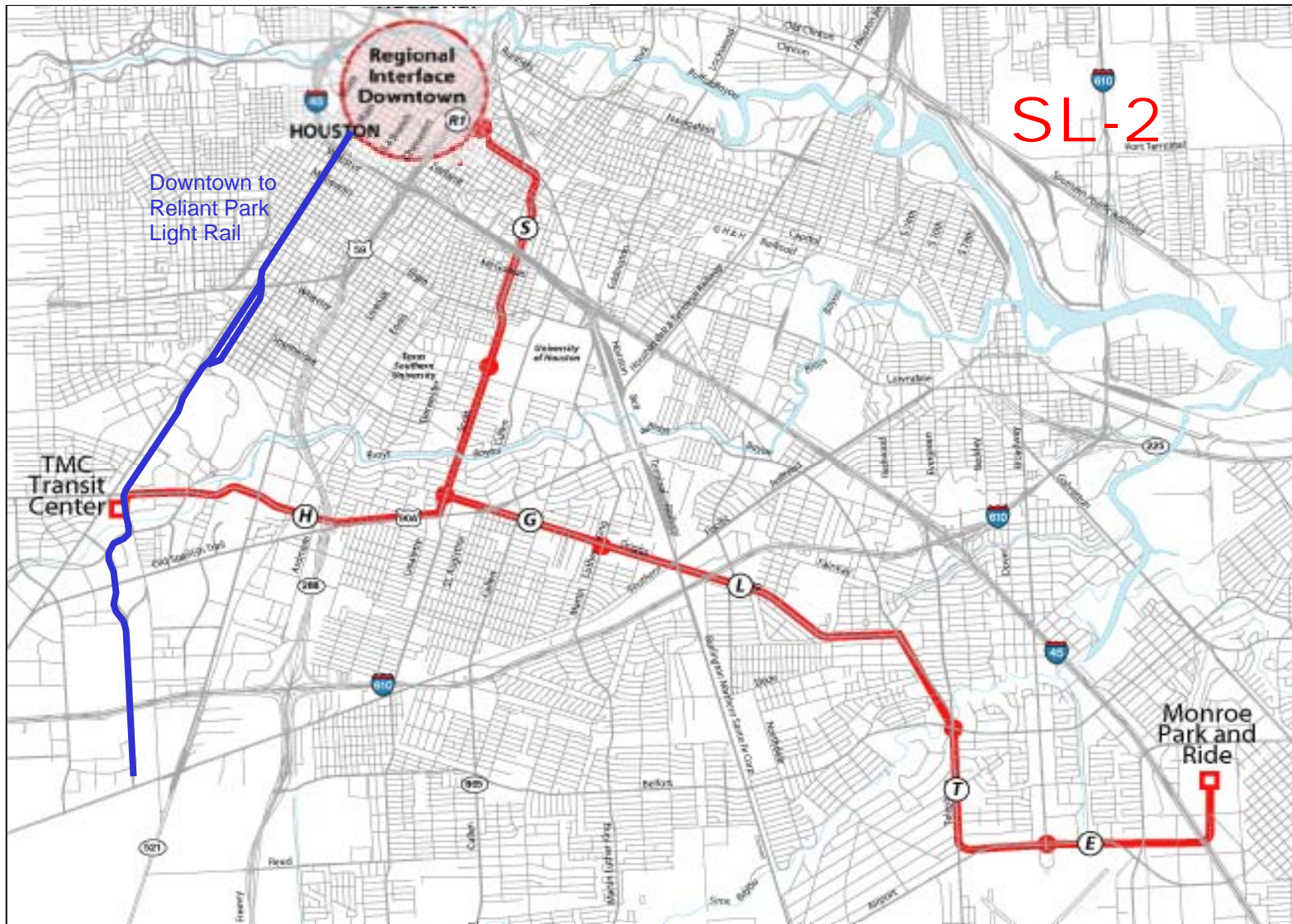




SL-1

[Source: Parsons Brinckerhoff]

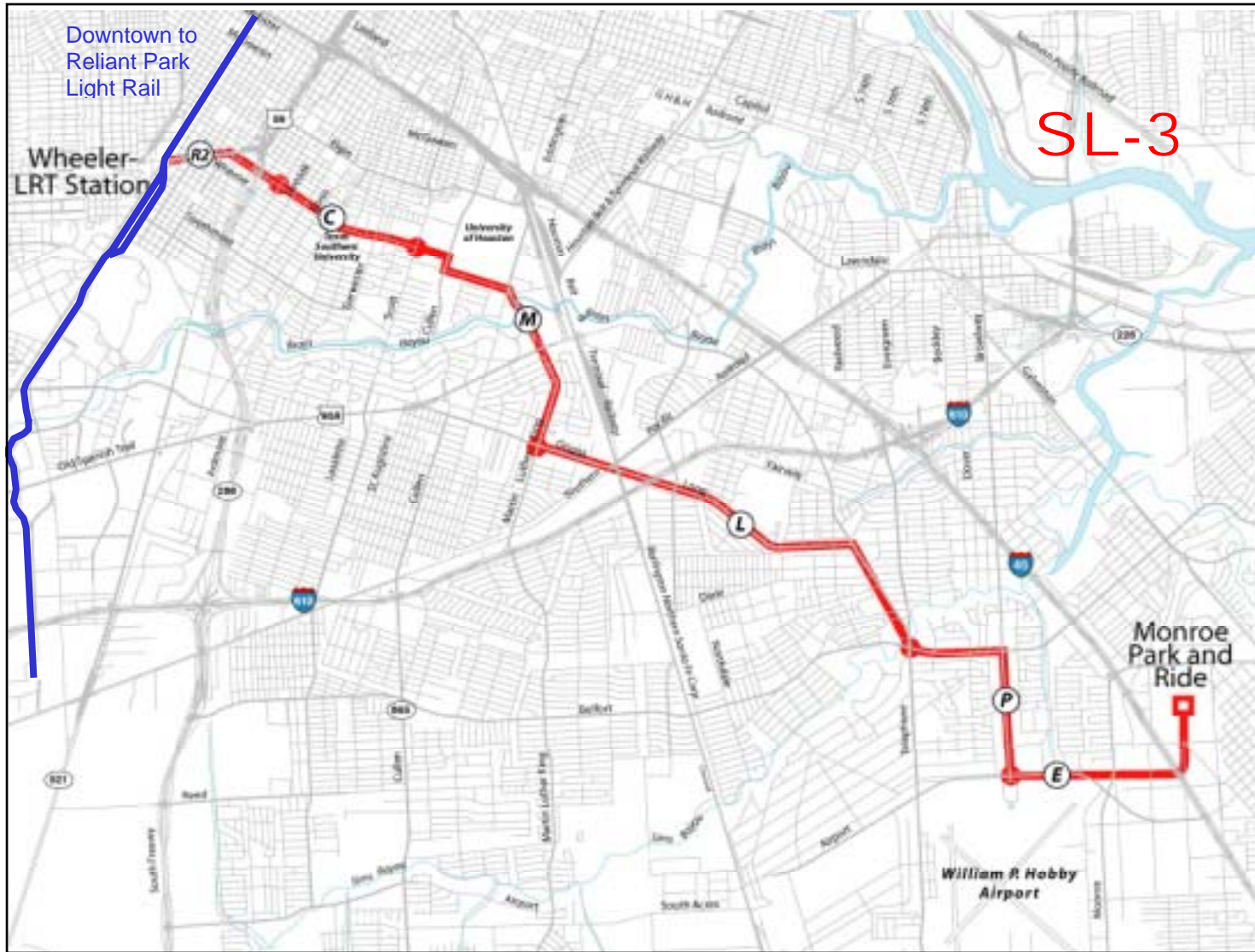




SL-2

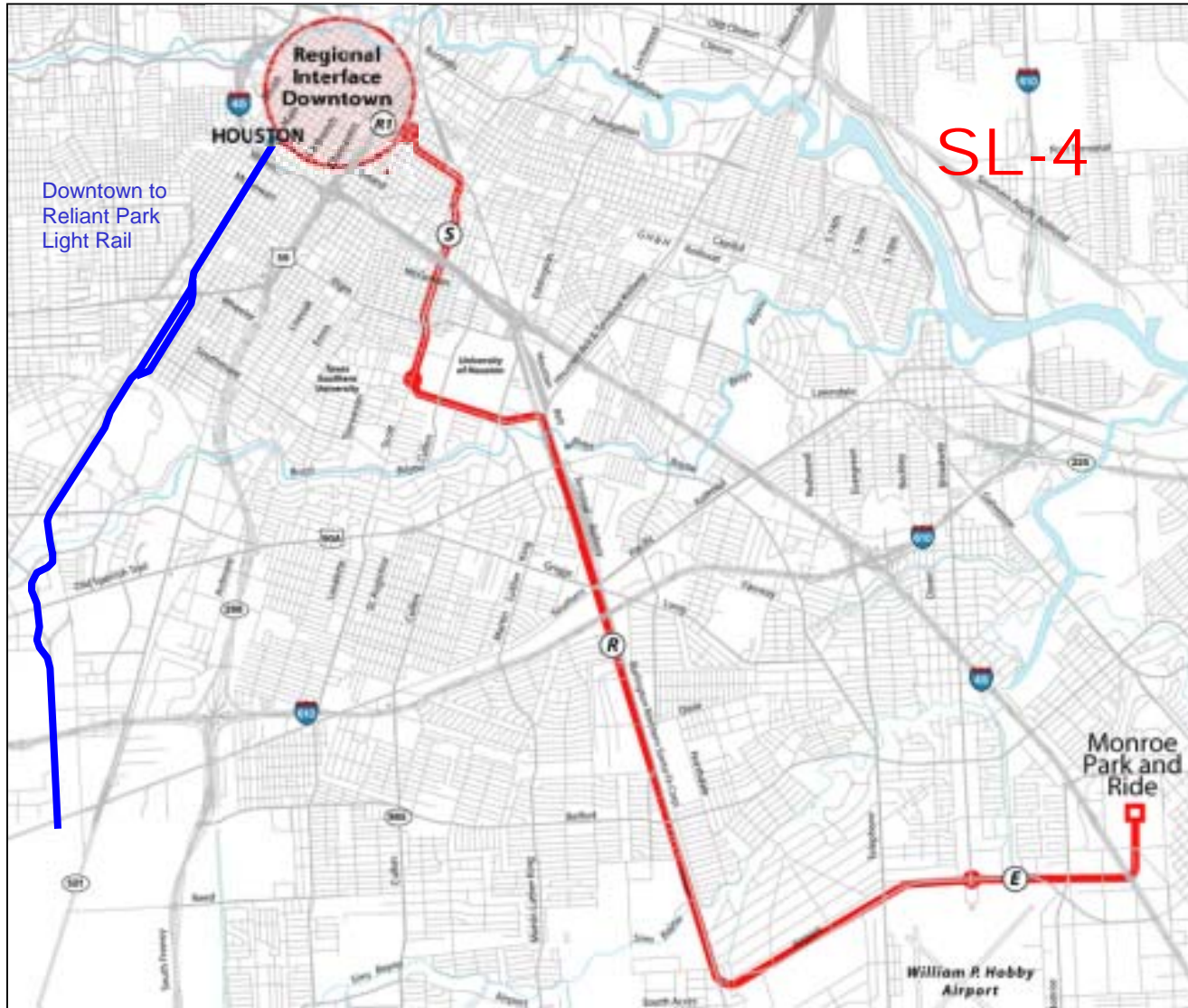
[Source: Parsons Brinckerhoff]





[Source: Parsons Brinckerhoff]





SL-4

Downtown to
Reliant Park
Light Rail

Monroe
Park and
Ride

[Source: Parsons Brinckerhoff]



2.4.2 Technology Options

Considering the particular route location options available in this corridor, and considering the trip lengths to be served within the corridor, only two technologies should be considered for AHCT in the Southeast-Universities-Hobby corridor. These are BRT and LRT. The two modes can be very similar in their physical and functional characteristics, with the result that they can be regarded as interchangeable at this point in the study, in terms of route and station locations, service frequency, and running times. There will be differences in capital cost and in operating and maintenance cost, which can be estimated once physical and service parameters for the AHCT route alternatives in the corridor have been determined.

2.5 Refinement of the Short List

In this stage of the Alternatives Analysis, the four alternatives of the Short List were the subject of more detailed conceptual-level study and evaluation. The process was conducted in accordance with the alternatives evaluation methodology and in close coordination with the CIC and public, and included:

- Functional Design Criteria and Conceptual design of the four alternative routes including horizontal alignment, typical cross sections, requirements for water crossings, grade separations, and any other major structures, location of stations, and siting of a maintenance and storage facility;
- Preparation of comparative conceptual-level capital cost estimates for each alternative as LRT and as BRT, based on a cost estimation methodology being applied to the various corridor studies;
- Bus and AHCT conceptual-level operations planning for each alternative, to define the transit network within the corridor and its relationship to the adjoining regional network;
- Preparation of demand potential and accompanying indicators such as user travel times and transit operational factors;
- Preparation of estimates of operating and maintenance cost for each alternative as LRT and as BRT, based on a cost estimation methodology being applied to all the various corridor studies; and,
- Preliminary environmental analysis of the route alternatives as LRT and as BRT, considering effects on traffic, visual effects, noise and vibration, effects on the natural environment, and historic and archeological sites.

To the extent possible, evaluation data have been assembled at the route segment level, to facilitate making the best choice between route alternatives at that level of detail. In this way, the concluding route recommendation can be a combination of the best segments and features of each of the four Short List route alternatives.

The products of these conceptual level documents are available for reference upon request. An evaluation of the two remaining AHCT mode technologies, LRT and BRT, is also included, based on the capital cost and functional issues.

2.5.1 Alignments

Station Locations

Station sites were selected with the objective of optimizing overall public transit system performance. This objective recognizes that AHCT is one of several transit modes that must work together to serve tripmakers. In the Southeast-Universities-Hobby corridor, almost all existing service consists of local routes, which provide excellent coverage due to their extent and frequent stops, but at a low average speed (about 12 miles per hour). AHCT can augment the local service by providing a higher-speed service for trips of intermediate and greater length. Higher speed is accomplished in part by design to minimize traffic conflicts, through the use of reserved right of way and traffic signal priority. Another essential feature to achieve higher speed, however, is to limit the number of stops (stations). This is done by locating stations only at points where there are relatively large passenger origins and destinations, and at convenient points of transfer between AHCT and local bus services. In the Southeast-Universities-Hobby corridor, this approach results in an average station spacing of about 0.8 miles.

Figure 2-19 through Figure 2-22 show the four alternatives including station locations selected for each. The number and location of stations is subject to later refinement, as are other details of the alignments.

Hobby Airport: At the time of preparing this report, a new Hobby Airport Master Plan was in preparation. METRO was coordinating with the Houston Airport System in planning for a Hobby Airport Transit Center as well as a location for a Hobby Airport AHCT station. These two sites may ultimately be combined. For the present purposes, however, reference is made only to the Hobby Airport AHCT station.

An alternative terminal station: The alternatives extend beyond Hobby Airport to the Monroe Park & Ride, as a test of the value of tying the corridor's AHCT service into the regional service that extends farther to the south. This link is an expensive one, however, due to its length and particularly to the fact that it must include an elevated segment of guideway long enough to cross the Gulf Freeway. Anticipating the possibility that the Monroe Park & Ride link will prove too expensive in comparison with its transportation value, an alternative terminal station was identified. The selected location is just north of Airport Boulevard to the east of Hinman. At this location there is vacant land that could be used to provide surface parking and space for bus-AHCT passenger interchange. Adoption of the Hinman Station as the terminal station instead of Monroe Park & Ride would reduce the route length by 1.13 miles and would reduce one-way running time by 1.45 minutes (preliminary estimates).

Transit Centers: Because of the importance of passenger transfers in achieving effective use of AHCT in the corridor, the introduction of additional transit centers was considered. Also, the alignment of one of the alternatives (SL-2) requires relocation of the existing Southeast Transit Center. This Center would be rebuilt at a site on the north side of Old Spanish Trail, between Old Spanish Trail and Griggs Road a short distance to the west of the intersection of these two streets. There are plans to build Transit Centers at the University of Houston and at Hobby Airport. Sites for these Transit Centers are still under discussion, but it is anticipated that their locations can be contiguous with AHCT stations. Finally, the need for a Transit Center is seen at the intersection of MLK and Bellfort, which will be a major transfer point for Alternative SL-1.

Design Criteria and Conceptual Design

The design criteria, standards, and typical cross sections used in the development of the AHCT alternatives are documented in the Southeast-Universities-Hobby Planning Study Draft Functional Design Criteria report, dated September 2002. The engineering and design of the short listed alternatives is reflected in the Conceptual Engineering Drawings dated November 2002.

Conceptual Alignments

This section describes the conceptual alignments of the four build alternative alignments and alignment options. Conceptual alignment plans of the alternatives have been developed at a scale of 1 inch = 400 feet (1:4800) and were used as a basis for the alternatives analysis. It should be noted that these alignments are conceptual in nature, and that the alignment of the alternative selected as the LPIS will continue to be refined as the project advances through subsequent design, environmental, and public involvement phases.

As seen from Figure 2-19 through Figure 2-22, the four alternative alignments are composed of several different sectors based upon the street used. Those sectors are further divided into segments for detailed evaluation purpose. Table 2-9 through Table 2-12 list the segments for all four alternatives.

Table 2-9. Alternative SL-1 Base Segments

Segment No.		Description
C	C-1	CAPITOL - FROM BAGBY TO WEST OF CAROLINE
	C-2	CAPITOL - FROM WEST OF CAROLINE TO CHENEVERT
	C-3	CAPITOL - FROM CHENEVERT TO BASTROP
	C-4	CAPITOL/DOWLING - FROM BASTROP TO RUSK
R	R-1	RUSK - FROM BAGBY TO WEST OF CAROLINE
	R-2	RUSK - FROM WEST OF CAROLINE TO CHENEVERT
	R-3	RUSK - FROM CHENEVERT TO DOWLING
D	D-1	DOWLING - FROM RUSK TO LEELAND
	D-2	DOWLING - FROM LEELAND TO CLEBURNE
U	U-2	CLEBURNE - FROM DOWLING TO SCOTT (STATION EQUATION)
	U-3	WHEELER - FROM SCOTT TO MLK
M	M-1	MLK - FROM WHEELER TO GRIGGS
	M-2	MLK - FROM GRIGGS TO BELLFORT
B	B-1	BELLFORT - FROM MLK TO TELEPHONE
	B-2	BELLFORT - FROM TELEPHONE TO BROADWAY
P		BROADWAY - FROM BELLFORT TO HOBBY AIRPORT
E	E-3	AIRPORT - FROM HOBBY AIRPORT TO EAST OF HINMAN (STATION EQUATION)

Table 2-10. Alternative SL-2 Base Segments

Segment No.		Description
C	C-1	CAPITOL - FROM BAGBY TO WEST OF CAROLINE
	C-2	CAPITOL - FROM WEST OF CAROLINE TO CHENEVERT
	C-3	CAPITOL - FROM CHENEVERT TO BASTROP
	C-5	TRANSITION FROM CAPITOL TO DOWLING - FROM BASTROP TO RUSK
R	R-1	RUSK - FROM BAGBY TO WEST OF CAROLINE
	R-2	RUSK - FROM WEST OF CAROLINE TO CHENEVERT
	R-3	RUSK - FROM CHENEVERT TO DOWLING
S	S-1	WALKER/SCOTT - FROM DOWLING TO LEELAND
	S-2	SCOTT - FROM LEELAND TO CLEBURNE
	S-3	SCOTT - FROM CLEBURNE TO GRIGGS
G	G-1	GRIGGS - FROM SCOTT TO MLK
	G-2	GRIGGS - FROM MLK TO BNSF RR
L		LONG - FROM BNSF RR TO TELEPHONE
T	T-1	TELEPHONE - FROM LONG TO SIMS BAYOU
	T-2	TELEPHONE - FROM SIMS BAYOU TO FAUNA
E	E-2	AIRPORT - FROM FAUNA TO HOBBY AIRPORT (STATION EQUATION)
	E-3	AIRPORT - FROM HOBBY AIRPORT TO EAST OF HINMAN (STATION EQUATION)
H		SPUR ALONG FANNIN/HOLCOMBE/OST FROM TMC TO SE TRANSIT CENTER

Table 2-11. Alternative SL-3 Base Segments

Segment No.		Description
U	U-1	SR 59 AND CLEBURNE - FROM FANNIN TO DOWLING
	U-2	CLEBURNE - FROM DOWLING TO SCOTT (STATION EQUATION)
	U-3	WHEELER - FROM SCOTT TO MLK
M	M-1	MLK - FROM WHEELER TO GRIGGS
G	G-2	GRIGGS - FROM MLK TO BNSF RR
L		LONG - FROM BNSF RR TO TELEPHONE
T	T-1	TELEPHONE - FROM LONG TO BELLEFORT
B	B-2	BELLEFORT - FROM TELEPHONE TO BROADWAY
P		BROADWAY - FROM BELLEFORT TO HOBBY AIRPORT
E	E-3	AIRPORT - FROM HOBBY AIRPORT TO EAST OF HINMAN (STATION EQUATION)

Table 2-12. Alternative SL-4 Base Segments

Segment No.		Description
C	C-1	CAPITOL - FROM BAGBY TO WEST OF CAROLINE
	C-2	CAPITOL - FROM WEST OF CAROLINE TO CHENEVERT
	C-3	CAPITOL - FROM CHENEVERT TO BASTROP
	C-5	TRANSITION FROM CAPITOL TO DOWLING - FROM BASTROP TO RUSK
R	R-1	RUSK - FROM BAGBY TO WEST OF CAROLINE
	R-2	RUSK - FROM WEST OF CAROLINE TO CHENEVERT
	R-3	RUSK - FROM CHENEVERT TO DOWLING
S	S-1	WALKER/SCOTT - FROM DOWLING TO LEELAND
	S-2	SCOTT - FROM LEELAND TO CLEBURNE
U	U-3	WHEELER - FROM SCOTT TO MLK
N		BNSF RR FROM MLK TO AIRPORT
E	E-1	AIRPORT - FROM BNSF RR TO FAUNA
	E-2	AIRPORT - FROM FAUNA TO HOBBY AIRPORT (STATION EQUATION)
	E-3	AIRPORT - FROM HOBBY AIRPORT TO EAST OF HINMAN (STATION EQUATION)

The AHCT alternative alignments in the Southeast-Universities-Hobby Corridor would provide a dual guideway their full length and be constructed primarily at-grade in the median or adjacent to existing surface streets, and in some cases, within new rights-of-way. Alignments along surface streets would generally have at-grade intersections with cross streets. All streets crossing the alignments at-grade would be controlled by traffic signals, which may be preempted by, or give priority to, the AHCT system. Aerial structures would be provided at locations where it is necessary for the alignment to cross main line freight railroad tracks, major freeways, or waterways. Since the BRT alignments have generally been conceptually designed to be readily convertible to LRT in the future, a single alignment description is provided for both technology modes. Where minor variations in alignment occur between the two modes, a description of the differences is provided in the segment descriptions.

Route lengths should be treated as approximate at this stage of planning, due to the conceptual level of design applied. Some parts of the Alternatives Analysis were developed prior to completion of conceptual design, with the result that there may be minor variations in reported route lengths in this section, compared with other sections of this report.

2.5.1.1 Alternative SL-1

The alignment for Alternative SL-1 would extend from a northern terminus at the Bagby/Smith Station in downtown Houston southeast to a new AHCT station at the existing METRO Monroe Park and Ride lot located on the east side of Interstate 45 north of Canniff Street.

The total length of the Alternative SL-1 alignment is 15.6 miles. The alignment and station locations for this alternative are shown in Figure 2-19. The following text describes the BRT and LRT alternative alignment as it starts in the Houston central business district (Segments C and R) and continues south and east to its southern terminus at the Monroe Park and Ride Station (Segment E-4).

Capitol/Rusk Streets Between Bagby and Dowling Streets (Segments C and R)

The alignment for this segment begins in Rusk Street and Capitol Street at a station located in the block between Brazos and Smith (Bagby/Smith Station). The alignment along Rusk and Capitol Streets would consist of a one-way couplet with one guideway on Rusk Street and one on Capitol Street. From Bagby Street, the southbound (outbound) line would follow an at-grade alignment located adjacent to but not in the north curb lane along Rusk Street to Dowling Street with three traffic lanes on the right hand side of the street.

Along Capitol Street, the northbound (inbound) line would be located adjacent to but not in the south curb lane between Bagby and Dowling Streets with three traffic lanes on the right hand side of the street. In both cases, any traffic using the curb lane adjacent to the AHCT line would be restricted to through or left-only movement at intersections. BRT and LRT vehicles would operate with the flow of traffic on both streets since Rusk Street is one-way eastbound and Capitol Street is one-way westbound. Operations would be turned around with a single connecting line in Bagby Street between Capitol and Rusk Streets. One existing travel lane would be removed from both Capitol and Rusk Streets to accommodate the AHCT lines within the existing right-of-way, which would reduce the total number of traffic lanes on each street from five to four.

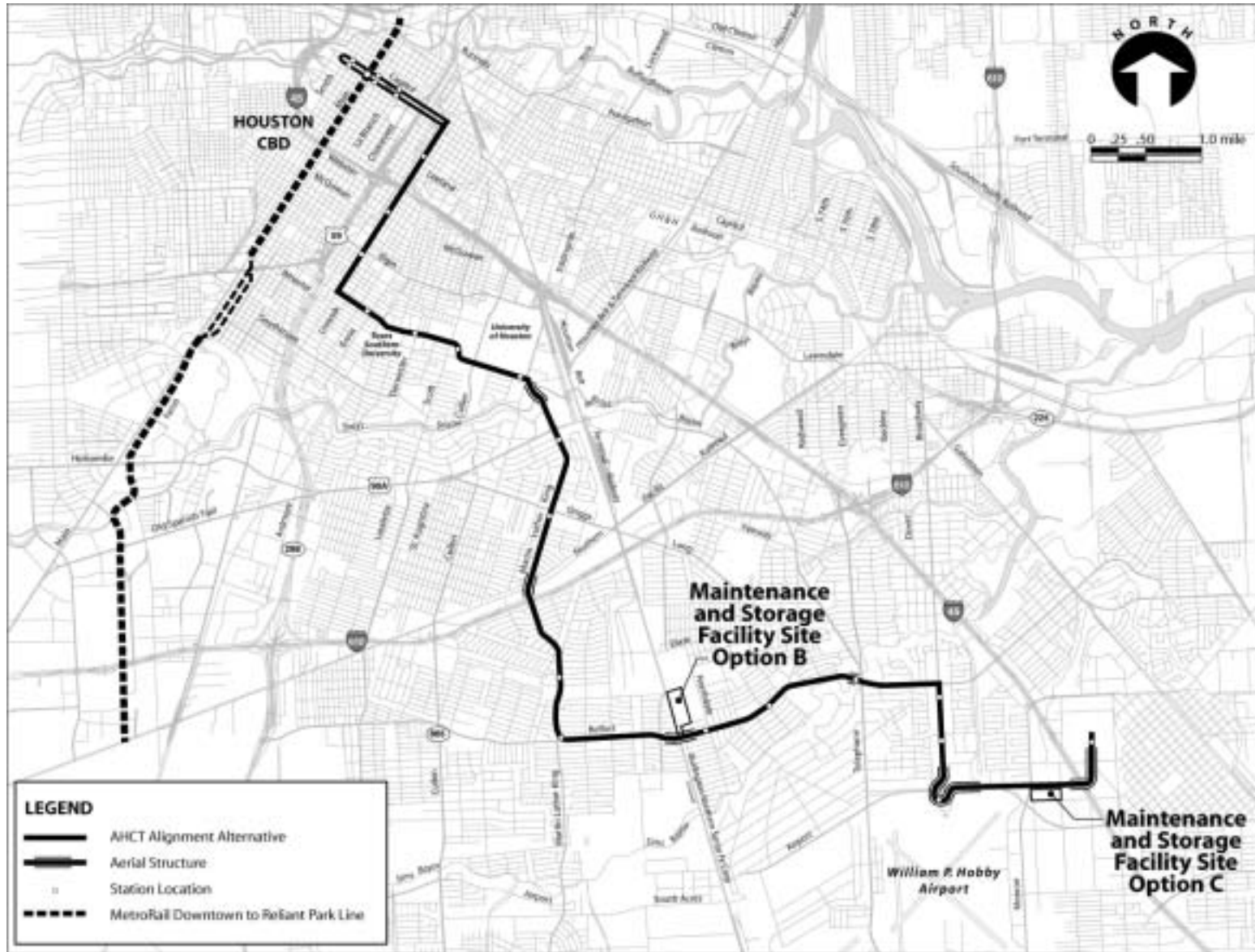
There are four stations proposed for this segment of the AHCT alignment. Three stations would be located in Capitol and Rusk Streets and would be comprised of two separate side platforms, one for the southbound (outbound) operations in Rusk Street and one for the northbound (inbound) operations in Capitol Street. The locations would include stations between Brazos and Smith Streets (Bagby/Smith Station), between Main and Fannin Streets (Main/Fannin Station), and between Crawford and Jackson Streets (Crawford/Jackson Station). Station platforms would replace the curb lane in those blocks having stations.

The fourth station in this segment would be a new LRT station on the METRORail Downtown to Reliant Park line. It would be located along Main Street between Capitol and Rusk Streets (Capitol/Rusk Station). The northbound lane on Main Street would be closed between Capitol and Rusk to accommodate the new northbound LRT platform.

Dowling Street Between Rusk and Cleburne Streets (Segment D)

From the intersection of Rusk Street and Capitol Street with Dowling Street, the one-way couplet alignment would turn south and transition to a dual at-grade configuration in the middle of Dowling Street and continue south to Cleburne Street. The curb lane parking on both sides of Dowling would be removed and the curb-to-curb width on Dowling would be widened from 42 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would remain with the AHCT line operating in an exclusive median.

The first station in this segment would be located in Dowling Street at the Leeland Street intersection. Two additional stations would be located in Dowling Street at McGowan Street and at Elgin Street.



S:\X\Plan\02-Houston SE Corridor\1108\6\AA\Airport\Alternatives\SL1 Aerial Structure



Cleburne/Wheeler Streets Between Dowling Street and Martin Luther King Boulevard (Segment U-2 and U-3)

At the intersection of Dowling Street and Cleburne Street, the alignment would turn east through the intersection and continue in an at-grade configuration in the middle of Cleburne Street. The curb-to-curb width on Cleburne, which varies from 28 to 34 feet, would be widened to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would continue to be provided with the AHCT line operating in a reserved right-of-way in the median.

The alignment would continue in this configuration to the intersection of Cleburne Street and Scott Street. At Scott Street the alignment would curve to the southeast through the intersection, crossing Scott Street at-grade and continuing to a station located at the University of Houston Robertson Stadium parking lot. Continuing from the Scott Street Station, the alignment would curve back to the east through the intersection of Cougar Place and Wheeler Street and transition to an at-grade configuration the middle of Wheeler Street. This section of the alignment between Scott and Wheeler Streets would require acquisition of private right-of-way to accommodate the AHCT line and station.

The alignment would continue along the middle of Wheeler Street to the intersection of Martin Luther King Boulevard. The curb-to-curb width on Wheeler would be widened from 37 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would continue to be provided with the AHCT line operating in an exclusive median.

There are four stations proposed for this segment of the AHCT alignment: in Cleburne Street at Ennis Street (Ennis Street Station), in Cleburne Street between Nettelton and Tierwester Streets (Nettelton/Tierwester Station), at the University of Houston Robertson Stadium (Scott Street Station), and in Wheeler Street at University Oaks Boulevard (University Oaks Station).

Martin Luther King Boulevard between Wheeler and Belfort Streets (Segment M)

At the intersection of Wheeler Street and Martin Luther King Boulevard, the alignment would turn southeast through the intersection and continue in an at-grade configuration in the middle of Martin Luther King Boulevard. The existing median width of 33 feet is wide enough to accommodate the dual AHCT line while maintaining the three lanes of traffic in each direction. Some roadway widening would be required to construct the station platforms within this segment; however, the widening could be accomplished within the existing right-of-way width of 120 feet.

From the Wheeler Street and Martin Luther King Boulevard intersection, the alignment would proceed south and cross over Brays Bayou on a new bridge structure. After crossing Brays Bayou, the alignment would continue south in the median in an at-grade configuration and follow the existing alignment of the roadway to just south of Cosby Street. At this point the alignment would transition to aerial structure and fly over the Southern Pacific Railroad.

After the grade separated over crossing of the Southern Pacific Railroad, the aerial alignment would begin to descend on retained fill within the median of Martin Luther King Boulevard and reach existing grade just north of Interstate 610. After crossing under Interstate 610, the alignment would continue south in the median in an at-grade configuration and follow the existing alignment of the roadway to just north of Belfort Street. At this point, the alignment would curve to the southeast leaving the Martin Luther King Boulevard right-of-way where it would continue to a station located in the northeast quadrant of the Martin Luther King Boulevard and Belfort Street intersection.

There are four stations proposed for this segment of the AHCT alignment: in Martin Luther King Boulevard between Winnetka and Arvilla (Winnetka/Arvilla (OST) Station), south of Griggs Road (Griggs Road Station), between Southseas and Pershing Streets

(Southseas/Pershing Station), and in the northeast quadrant of the Martin Luther King Boulevard and Bellfort Street intersection (MLK/Southbank Station).

Bellfort Street between Martin Luther King Boulevard and Broadway Street (Segment B)

After leaving Martin Luther King/Southbank Station, the alignment would curve to the east, cross the westbound lanes of Bellfort Street, and enter the existing median of Bellfort. After entering the median of Bellfort Street, the alignment would proceed east in the median in an at-grade configuration and follow the existing alignment of the roadway to just west of Wayside Drive. At this point, the at-grade alignment would begin to transition to an aerial configuration, and then cross over the Burlington Northern Santa Fe Railroad.

After crossing over the Burlington Northern Santa Fe Railroad, the alignment would begin to descend to grade on retained fill within the median of Bellfort Street. After transitioning to an at-grade configuration just west of Northdale Street, the alignment would proceed east in the existing median crossing over Sims Bayou on a new bridge structure. After crossing Sims Bayou, the alignment would continue east in the median in an at-grade configuration and follow the existing alignment of the roadway to the Broadway Street intersection.

The existing median width of 30 feet is wide enough to accommodate the dual AHCT line while maintaining the two existing lanes of traffic in each direction. Some roadway widening would be required to construct the station platforms within this segment; however, the widening could be accomplished within the existing right-of-way width of 100 feet.

There are three stations proposed for this segment of the AHCT alignment: in Bellfort west of Northdale (West of Northdale Station), east of Plainview (East of Plainview Station), and east of Telephone (Bellfort East of Telephone Station).

Broadway Street between Bellfort Street and Hobby Airport (Segment P)

At the intersection of Bellfort and Broadway Streets, the alignment would turn south through the intersection and proceed in an at-grade configuration in the existing median of Broadway. The alignment would continue south in the existing median and follow the existing alignment of the roadway to a point south of Rockhill Street. At this point, the alignment would begin to transition to an aerial configuration in the median of Broadway Street, and then fly over the Morley Street intersection. The existing median width of 40 feet is wide enough to accommodate the dual AHCT line while maintaining the two existing lanes of traffic in each direction.

After crossing over Morley Street, the alignment would curve slightly to the west out of the median and continue in an aerial configuration over the southbound lanes of Broadway Street. A straddle bent structure would be used between Morley Street and Airport Boulevard to preserve the southbound traffic lanes and to minimize the acquisition of private right-of-way. As the aerial alignment approaches Airport boulevard, it would curve to the west then turn back to the east, crossing over Airport Boulevard and continuing to an aerial station at Hobby Airport. Additional right-of-way would have to be acquired at the northwest quadrant of the Broadway Street intersection with Airport Boulevard and south of Airport Boulevard to accommodate the aerial guideway.

The two stations in this segment would be located in the median Broadway south of Bellfort Street (Broadway South of Bellfort Station) and south of Rockhill Street (South of Rockhill Station).

Airport Boulevard between Hobby Airport and Monroe Road (Segment E-3)

From the Hobby Airport Station, the aerial alignment would curve to the northeast, cross over the Airport Loop Roads and the eastbound lanes of Airport Boulevard and then curve to the

east and transition to the median of Airport Boulevard. The alignment would continue on aerial structure in the median of Airport Boulevard until crossing over Glencrest Street. After crossing over Glencrest Street, the alignment would begin to descend to grade on retained fill within the median of Airport Boulevard.

After transitioning to an at-grade configuration within the median of Airport Boulevard near Ruthby Street, the alignment would proceed in the median at the same line and grade as the existing roadway to Hinman Street. At Hinman Street, the alignment would curve to the northeast and cross the westbound lanes of Airport Boulevard and proceed in an at-grade configuration to a point approximately 400 feet west of Monroe Road where this segment would end.

The one station proposed for this segment of the AHCT alignment is the aerial station at Hobby Airport (Hobby Airport Station).

Private Right-of-Way/Mosley Road between Monroe Road and the Monroe Park and Ride (Segment E-4)

From a point approximately 400 feet west of Monroe Road, the alignment would continue east in an at-grade configuration to just east of Hansen Road. At this point, the at-grade alignment would begin to transition to an aerial configuration and fly over the southbound and northbound lanes of Interstate 45.

After crossing over Interstate 45, the alignment would continue on aerial structure and curve to the north to parallel the east side of the Mosley Road right-of-way. After crossing over Canniff Street and East Haven Boulevard on aerial structure, the alignment would begin to descend to grade on retained fill along the east side of Mosley Road. The alignment would transition to grade at approximately 800 feet north of Canniff Street where a terminus station and tail track would be provided.

The one station in this segment would be located at the existing METRO Monroe Park and Ride lot (Monroe Park and Ride Station).

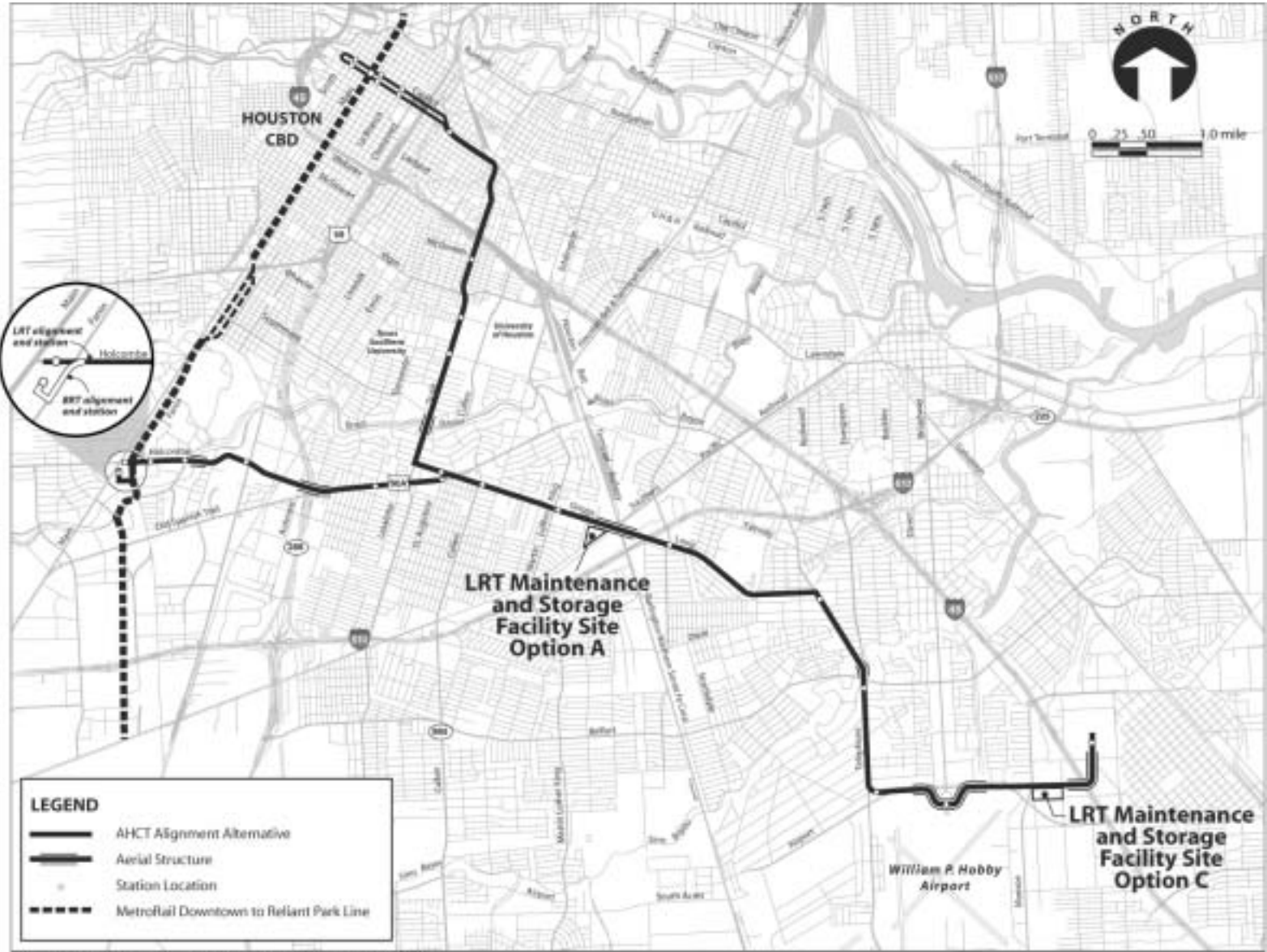
2.5.1.2 Alternative SL-2

The alignment for Alternative SL-2 would extend from a northern terminus at the Bagby/Smith Station in downtown Houston southeast to a new AHCT station at the existing METRO Monroe Park and Ride lot located on the east side of Interstate 45 north of Canniff Street. The total length of the Alternative SL-2 alignment is 16.9 miles, which includes the 3.3-mile-long spur alignment along Holcombe and Old Spanish Trail from the Texas Medical Center to the Southeast Transit Center. The alignment and station locations for this alternative are shown in Figure 2-20.

The following text describes the BRT and LRT alternative alignment as it starts in the Houston central business district (Segments C and R) and continues south and east to its southern terminus at the Monroe Park and Ride Station (Segment E-4).

Capitol/Rusk Streets Between Bagby and Dowling Streets (Segments C and R)

The alignment for this segment begins in Rusk Street and Capitol Street at a station located in the block between Brazos and Smith (Bagby/Smith Station). The alignment along Rusk and Capitol Streets would consist of a one-way couplet with one guideway on both Rusk Street and Capitol Street. From Bagby Street, the southbound (outbound) line would follow



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an at-grade alignment located in the north curb lane along Rusk Street to Dowling Street with four traffic lanes on the right hand side of the street.

Along Capitol Street, the northbound (inbound) line would be located in the south curb lane between Bagby and Dowling Streets with four traffic lanes on the right hand side of the street. BRT and LRT vehicles would operate with the flow of traffic on both streets since Rusk Street is one-way eastbound and Capitol Street is one-way westbound. Operations would be turned around with a single connecting line in Bagby Street between Capitol and Rusk Streets.

One existing travel lane would be removed from both Capitol and Rusk Streets to accommodate the AHCT lines within the existing right-of-way, which would reduce the total number of traffic lanes on each street from five to four.

Between Dowling and Bastrop Streets the northbound (inbound) line would transition from the one-way couplet configuration to a dual at-grade configuration at Dowling Street and continue to the Dowling/St. Charles Station in Segment S.

There are four stations proposed for this segment of the AHCT alignment. Three stations would be located in Capitol and Rusk Streets and would be comprised of two separate side platforms, one for the southbound (outbound) operations in Rusk Street and one for the northbound (inbound) operations in Capitol Street. The locations would include stations between Brazos and Smith Streets (Bagby/Smith Station), between Main and Fannin Streets (Main/Fannin Station), and between Crawford and Jackson Streets (Crawford/Jackson Station).

The fourth station in this segment would be a new LRT station on the METRORail Downtown to Reliant Park line. It would be located along Main Street between Capitol and Rusk Streets (Capitol/Rusk Station). The northbound lane on Main Street would be closed between Capitol and Rusk to accommodate the northbound LRT platform.

Walker/Scott Streets Between Dowling Street and Griggs Road (Segment S)

From the southeast corner of the intersection of Rusk with Dowling Street, the alignment would continue southeast in an at-grade configuration and enter the abandoned railroad right-of-way and continue to a station platform located diagonally within the block formed by Dowling, St. Charles, Rusk, and Walker Streets. The alignment would then curve to the east through the St. Charles/Walker Street intersection and transition into an at-grade alignment in the middle of Walker Street and continue to Ennis Street. One lane of traffic in each direction would be maintained on Walker Street between St. Charles Street and Ennis Street with the AHCT line operating in an exclusive median.

At Ennis Street, the existing traffic lanes on Walker Street end at a three-way intersection. At this point, the alignment would transition from the middle of the Walker right-of-way to parallel the south side of the existing railroad tracks and continue in this configuration to Scott Street. The line would utilize the unused portion of existing right-of-way and would also require acquisition of additional right-of way and relocations along the south side of the Walker Street right-of-way.

At the intersection of the Walker Street right-of-way and Scott Streets, the alignment would turn south and continue in an at-grade configuration in the middle of Scott Street to Interstate 45. The existing median width of 30 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the existing two lanes of traffic in each direction.

After crossing underneath Interstate 45, the alignment would continue in the middle of Scott Street to Elgin Street. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing six lanes of traffic and the dual AHCT line. To accommodate the

AHCT line, two travel lanes in each direction would be eliminated with the AHCT line operating in an exclusive median.

From the Elgin Street intersection, the alignment would continue south at-grade in the median of Scott Street to the intersection of Griggs Road, where it would turn east through the intersection into the middle of Griggs. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing four lanes of traffic and the dual AHCT line. To accommodate the AHCT line, one travel lane in each direction would be eliminated and the existing median width, which varies from 0 feet to 12 feet, would be widened to allow the AHCT line to operate in an exclusive median.

There are five stations proposed for this segment of the AHCT alignment. The first station in this segment would be located in the abandoned railroad right-of-way between Dowling and St. Charles Streets (Dowling/St. Charles Station). Four additional stations would be located in Scott Street at McGowan Street (Scott at McGowan Station), Holman Street (Holman Street Station), Wheeler Street (Wheeler Street Station), and at Southmore Street (Southmore Street Station).

Griggs Road/Long Drive between Scott Street and Telephone Road (Segments G and L)

At the intersection of Scott Street and Griggs Road, the alignment would turn east through the intersection and continue in an at-grade configuration in the middle of Griggs Road to Old Spanish Trail. The curb-to-curb width on Griggs in this section would be widened from 42 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would continue to be provided west of the limits of the Griggs/Southeast Transit Center (SETC) Station with the AHCT line operating in an exclusive median. At the Griggs/SETC Station, the eastbound traffic lane would be closed between the west edge of the station and the Griggs/Old Spanish Trail intersection.

An alternative to this alignment would be to continue south on Scott Street across Old Spanish Trail and then turn to the east, providing a station at the existing Southeast Transit Center, and then continuing eastward to re-enter the median of Griggs Road south of Old Spanish Trail. This alternative alignment has not been the subject of conceptual design, but will be considered at a later stage of plan development.

From the Old Spanish Trail intersection, the alignment would continue east in the existing median and follow the existing alignment of the roadway to a point just east of Beekman Road. At this point, the at-grade alignment would begin to transition to an aerial configuration, and then cross over the Burlington Northern Santa Fe and Union Pacific Railroads on aerial structure. After crossing over the Burlington Northern Santa Fe and Union Pacific Railroads on aerial structure, the alignment would begin to descend to grade on retained fill within the median of Long Drive. The existing median width of 28 feet in this section is sufficient to accommodate the dual AHCT line while maintaining the existing two lanes of traffic in each direction.

After transitioning to an at-grade configuration just west of Interstate 610, the alignment would proceed east in the existing median and cross under Interstate 610. It would then continue east in the median in an at-grade configuration to the Telephone Road intersection. The existing 22-foot median in this section would be widened to 28 feet to accommodate the dual AHCT line. The existing two lanes of traffic in each direction would be maintained.

There are four stations proposed for this segment of the AHCT alignment: Three would be located in Griggs Road between Scott Street and Old Spanish Trail (Griggs/SETC Station), east of Cullen Street (East of Cullen Station), and east of Martin Luther King Boulevard (East

of MLK Station). The fourth would be located in Long Drive east of Wayside (East of Wayside Station).

Telephone Road Between Long Drive and Airport Boulevard (Segment T)

At the intersection of Long Drive and Telephone Road, the alignment would turn south through the intersection and proceed in an at-grade configuration in the existing median of Telephone. The alignment would continue south in the existing median and follow the existing alignment of the roadway crossing over Sims Bayou on a new bridge structure. After crossing Sims Bayou, the alignment would continue east in the median in an at-grade configuration and follow the existing alignment of the roadway to the Fauna Street intersection. The existing median width of 28 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the three existing lanes of traffic in each direction.

At Fauna Street the alignment would turn to the east through the intersection and parallel the south side of Fauna to a station located between Telephone Road and Airport Boulevard. Continuing from the station, the alignment would continue east along the south side of Fauna and transition through the Fauna Street/Airport Boulevard intersection to the existing median of Airport Boulevard where this segment would end. This section of the alignment between Telephone Road and Airport Boulevard would require acquisition of private right-of-way to accommodate the AHCT line and station.

There are three stations proposed for this segment of the AHCT alignment: in Telephone south of Long (South of Long Station), in Telephone south of Belfort (Telephone South of Belfort Station), and along the south side of Fauna east of Telephone Road (Fauna East of Telephone).

Airport Boulevard Between Telephone Road and Hobby Airport (Segment E-2)

From the intersection of Fauna Street and Airport Boulevard, the alignment would continue east in an at-grade configuration in the existing median of Airport Boulevard to a point approximately one eighth of a mile east of the Fauna Street and Airport Boulevard intersection. The existing median width of 30 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the existing two lanes of traffic in each direction.

At this point, the at-grade alignment would transition to an aerial configuration and then cross over to the south side of Airport Boulevard, where it would proceed east along the south side of Airport Boulevard, crossing over the Airport Loop Road and airport parking lots to just west of the Hobby Airport Station. This section of the alignment between Airport Boulevard and Hobby Airport would require acquisition of private right-of-way to accommodate the AHCT line and station.

There would not be any stations within this segment of the alternative.

Airport Boulevard between Hobby Airport and Monroe Road (Segment E-3)

From the Hobby Airport Station, the aerial alignment would curve to the northeast, cross over the Airport Loop Roads and the eastbound lanes of Airport Boulevard and then curve to the east and transition to the median of Airport Boulevard. The alignment would continue on aerial structure in the median of Airport Boulevard until crossing over Glencrest Street. After crossing over Glencrest Street, the alignment would begin to descend to grade on retained fill within the median of Airport Boulevard.

After transitioning to an at-grade configuration within the median of Airport Boulevard near Ruthby Street, the alignment would proceed in the median at the same line and grade as the existing roadway to Hinman Street. At Hinman Street, the alignment would curve to the northeast and cross the westbound lanes of Airport Boulevard and proceed in an at-grade configuration to a point approximately 400 feet west of Monroe Road where this segment would end.

The one station proposed for this segment of the AHCT alignment is the aerial station at Hobby Airport (Hobby Airport Station).

Private Right-of-Way/Mosley Road between Monroe Road and the Monroe Park and Ride (Segment E-4)

From a point approximately 400 feet west of Monroe Road, the alignment would continue east in an at-grade configuration to just east of Hansen Road. At this point, the at-grade alignment would begin to transition to an aerial configuration and fly over the southbound and northbound lanes of Interstate 45.

After crossing over Interstate 45, the alignment would continue on aerial structure and curve to the north to parallel the east side of the Mosley Road right-of-way. After crossing over Canniff Street and East Haven Boulevard on aerial structure, the alignment would begin to descend to grade on retained fill along the east side of Mosley Road. The alignment would transition to grade at approximately 800 feet north of Canniff Street where a terminus station and tail track would be provided.

The one station in this segment would be located at the existing METRO Monroe Park and Ride lot (Monroe Park and Ride Station).

Texas Medical Center to the Southeast Transit Center (Segment H)

The BRT alignment for this segment would begin in an at-grade configuration at a terminus station at METRO's planned Texas Medical Center (TMC) Transit Center located northwest of the Galen Street and Fannin Street intersection. From the TMC Transit Center, the BRT alignment would exit and turn left onto Galen Street and continue east in a mixed traffic configuration utilizing the existing roadway traffic lanes to Fannin Street. At Fannin Street, the BRT alignment would turn to the north and enter the Fannin Street right-of-way. The northbound BRT alignment would operate in mixed traffic in the northbound curb lane while the southbound alignment would operate in mixed traffic in the southbound curb lane. The BRT alignment would continue in this configuration to the Holcombe Boulevard intersection where the northbound and southbound alignments would turn to the east, enter the middle of Holcombe Boulevard and join the LRT alignment for this segment described below.

The LRT alignment for this segment would begin at a terminal at-grade station located in the median of Holcombe Boulevard just west of the Fannin Street intersection with Holcombe. An improved pedestrian connection from the station would be provided to METRO's planned TMC Transit Center. From this point, the LRT alignment would continue east in an at-grade configuration in the median of Holcombe Boulevard to Fannin Street where it would join the BRT alignment described above. The AHCT alignment would continue in this configuration to the intersection of Holcombe Boulevard and Old Spanish Trail. The existing 11-foot median in this section would be widened to 28 feet and one lane of traffic in each direction would be removed to accommodate the dual AHCT line.

At Old Spanish Trail, the alignment would curve to the east through the intersection and transition to an at-grade configuration the middle of Old Spanish Trail. The existing 11-foot median in this section would be widened to 28 feet and one lane of traffic in each direction would be removed to accommodate the dual AHCT line. The alignment would continue along

the middle of Old Spanish Trail to a point approximately 1,200 feet east of Scott Street where the alignment would turn to the north and cross the westbound lanes of Old Spanish Trail and terminate at a station at the METRO Southeast Transit Center which would be relocated to a site bounded by Old Spanish Trail on the south, Griggs Road on the north, and St. Augustine Street on the east.

There are six stations proposed for this segment of the AHCT alignment: in Holcombe Boulevard at Fannin Street for LRT, or at the TMC Transit Center for BRT, in Holcombe Boulevard east of Bertner (Holcombe East of Bertner Station), in Holcombe Boulevard west of Alameda (Holcombe West of Alameda Station), in Old Spanish Trail west of Tierwester (Old Spanish Trail west of Tierwester Station), and at the relocated Southeast Transit Center (Southeast Transit Center Station).

2.5.1.3 Alternative SL-3

The alignment for Alternative SL-3 would extend from a northern terminus at the Fannin/San Jacinto Station, adjacent to the Downtown to Reliant Park Light Rail Wheeler Station, southeast to a new AHCT station at the existing METRO Monroe Park and Ride lot located on the east side of Interstate 45 north of Canniff Street. The total length of the Alternative SL-3 alignment is 11.6 miles. The alignment and station locations for this alternative are shown in Figure 2-21. The following text describes the BRT and LRT alternative alignment as it starts in the Museum District (Segment U-1) and continues south and east to its southern terminus at the Monroe Park and Ride Station (Segment E-4).

US 59-Southwest Freeway/Cleburne Street between Fannin and Dowling Streets (Segment U-1)

This segment would begin at the Fannin/San Jacinto Station in an at-grade configuration underneath the US 59-Southwest Freeway viaduct structure. This station would be adjacent to the Downtown to Reliant Park Light Rail Wheeler Station. From this station, the alignment would continue northeast underneath the US 59-Southwest Freeway viaduct structure to Cleburne Street. At Cleburne Street the alignment would turn to the east and enter the middle of Cleburne. The alignment would continue in this configuration to the intersection of Cleburne Street and Scott Street where this segment would end.

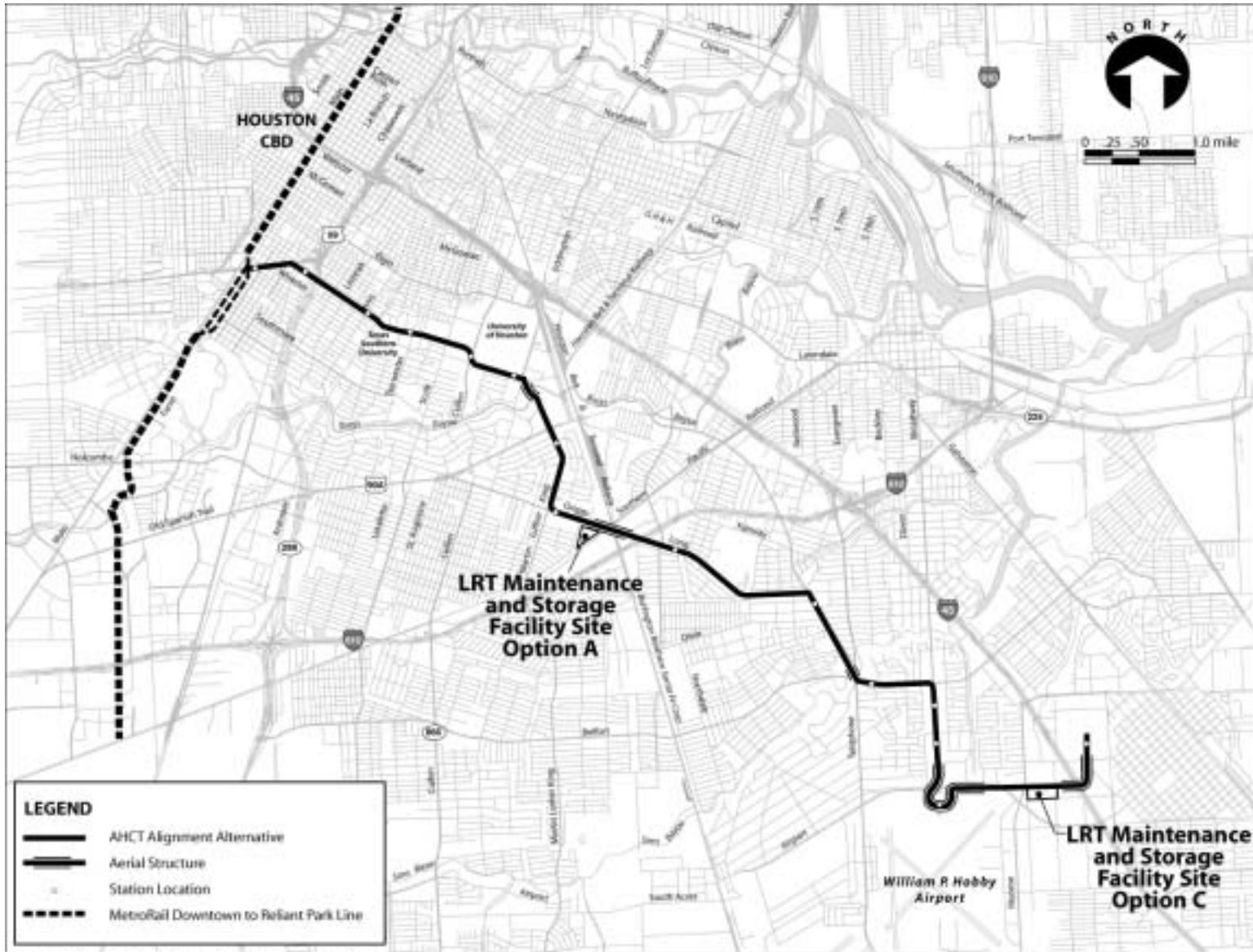
The existing ROW on Cleburne is 80 feet. The curb-to-curb width would be widened from 35 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would continue to be provided with the AHCT line operating in an exclusive median.

The two stations in this segment would be located underneath US 59 east of Fannin (Fannin/San Jacinto Station) and in Cleburne Street east of Alameda Street (Cleburne East of Alameda).

Cleburne/Wheeler Streets Between Dowling Street and Martin Luther King Boulevard (Segments U-2 and U-3)

At the intersection of Dowling Street and Cleburne Street, the alignment would proceed east through the intersection and continue in an at-grade configuration in the middle of Cleburne Street. The curb-to-curb width on Cleburne, which varies from 28 to 34 feet, would be widened to 48 feet to accommodate the AHCT line. The existing ROW in this segment varies from 60 to 80 feet. One lane of traffic in each direction would continue to be provided with the AHCT line operating in a reserved right-of-way in the median.

The alignment would continue in this configuration to the intersection of Cleburne Street and Scott Street. At Scott Street the alignment would curve to the southeast through the



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intersection, crossing Scott Street at-grade and continuing to a station located at the University of Houston Robertson Stadium parking lot. Continuing from the Scott Street Station, the alignment would curve back to the east through the intersection of Cougar Place and Wheeler Street and transition to an at-grade configuration the middle of Wheeler Street. This section of the alignment between Scott and Wheeler Streets would require acquisition of private right-of-way to accommodate the AHCT line and station.

The alignment would continue along the middle of Wheeler Street to the intersection of Martin Luther King Boulevard. The existing ROW on Wheeler is 60 feet. The curb-to-curb width would be widened from 37 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would continue to be provided with the AHCT line operating in an exclusive median.

There are four stations proposed for this segment of the AHCT alignment: in Cleburne Street at Ennis Street (Ennis Street Station), in Cleburne Street between Nettelton and Tierwester Streets (Nettelton/Tierwester Station), at the University of Houston Robertson Stadium (Scott Street Station), and in Wheeler Street at University Oaks Boulevard (University Oaks Station).

Martin Luther King Boulevard Between Wheeler Street and Griggs Road (Segment M-1)

At the intersection of Wheeler Street and Martin Luther King Boulevard, the alignment would turn southeast through the intersection and continue in an at-grade configuration in the middle of Martin Luther King Boulevard. The alignment would continue south and cross over Brays Bayou on a new bridge structure.

After crossing Brays Bayou, the alignment would continue south in the median in an at-grade configuration and follow the existing alignment of the roadway to the Griggs Road intersection where this segment would end. The existing median width of 33 feet is wide enough to accommodate the dual AHCT line. Some roadway widening would be required to construct the station platforms within this segment; however, the widening could be accomplished within the existing right-of-way width of 120 feet.

The one station proposed for this segment of the AHCT alignment would be located along Martin Luther King Boulevard between Winnetka and Arvilla (Winnetka/Arvilla (OST) Station).

Griggs Road/Long Drive between Martin Luther King Boulevard and Telephone Road (Segments G-2 and L)

From the intersection of Martin Luther King Boulevard and Griggs Road, the alignment would continue east in the existing median of Griggs Road and follow the alignment of the existing roadway to a point just east of Beekman Road. At this point, the at-grade alignment would begin to transition to an aerial configuration, and then cross over the Burlington Northern Santa Fe and Southern Pacific Railroads on aerial structure. After crossing over the Burlington Northern Santa Fe and Southern Pacific Railroads on aerial structure, the alignment would begin to descend to grade on retained fill within the median of Long Drive. The existing median width of 28 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the existing two lanes of traffic in each direction.

After transitioning to an at-grade configuration just west of Interstate 610, the alignment would proceed east in the existing median and cross under Interstate 610. It would then continue east in the median in an at-grade configuration to the Telephone Road intersection. The existing 22-foot median in this section would be widened to 28 feet to accommodate the dual AHCT line. The existing two lanes of traffic in each direction would be maintained.

There are two stations proposed for this segment of the AHCT alignment: in Griggs Road east of Martin Luther King Boulevard (East of MLK Station), and in Long Drive east of Wayside (East of Wayside Station).

Telephone Road Between Griggs Road and Bellfort Street (Segment T 1)

At the intersection of Long Drive and Telephone Road, the alignment would turn south through the intersection and proceed in an at-grade configuration in the existing median of Telephone. The alignment would continue south in the existing median and follow the existing alignment of the roadway crossing over Sims Bayou on a new bridge structure. After crossing Sims Bayou, the alignment would continue south in the median in an at-grade configuration and follow the existing alignment of the roadway to the Bellfort Street intersection where this segment would end. The existing median width of 28 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the three existing lanes of traffic in each direction.

The one station proposed for this segment of the AHCT alignment would be located in Telephone Road south of Long Drive (South of Long Station).

Bellfort Street Between Telephone Road and Broadway Street (Segment B-2)

At the intersection of Telephone Road and Bellfort Street, the alignment would turn east and continue in the median of Bellfort in an at-grade configuration and follow the existing alignment of the roadway to the Broadway Street intersection.

The one station proposed for this segment of the AHCT alignment would be located in Bellfort Street east of Telephone Road (Bellfort East of Telephone).

Broadway Street between Bellfort Street and Hobby Airport (Segment P)

At the intersection of Bellfort and Broadway Streets, the alignment would turn south through the intersection and proceed in an at-grade configuration in the existing median of Broadway. The alignment would continue south in the existing median and follow the existing alignment of the roadway to a point south of Rockhill Street. At this point, the alignment would begin to transition to an aerial configuration in the median of Broadway Street, and then fly over the Morley Street intersection. The existing median width of 40 feet is wide enough to accommodate the dual AHCT line while maintaining the two existing lanes of traffic in each direction.

After crossing over Morley Street, the alignment would curve slightly to the west out of the median and continue in an aerial configuration over the southbound lanes of Broadway Street. A straddle bent structure would be used between Morley Street and Airport Boulevard to preserve the southbound traffic lanes and to minimize the acquisition of private right-of-way. As the aerial alignment approaches Airport boulevard, it would curve to the west then turn back to the east, crossing over Airport Boulevard and continuing to an aerial station at Hobby Airport. Additional right-of-way would have to be acquired at the northwest quadrant of the Broadway Street intersection with Airport Boulevard and south of Airport Boulevard to accommodate the aerial guideway.

The two stations in this segment would be located in the median Broadway south of Bellfort Street (Broadway South of Bellfort Station) and south of Rockhill Street (South of Rockhill Station).

Airport Boulevard between Hobby Airport and Monroe Road (Segment E-3)

From the Hobby Airport Station, the aerial alignment would curve to the northeast, cross over the Airport Loop Roads and the eastbound lanes of Airport Boulevard and then curve to the east and transition to the median of Airport Boulevard. The alignment would continue on aerial structure in the median of Airport Boulevard until crossing over Glencrest Street. After crossing over Glencrest Street, the alignment would begin to descend to grade on retained fill within the median of Airport Boulevard.

After transitioning to an at-grade configuration within the median of Airport Boulevard near Ruthby Street, the alignment would proceed in the median at the same line and grade as the existing roadway to Hinman Street. At Hinman Street, the alignment would curve to the northeast and cross the westbound lanes of Airport Boulevard and proceed in an at-grade configuration to a point approximately 400 feet west of Monroe Road where this segment would end.

The one station proposed for this segment of the AHCT alignment is the aerial station at Hobby Airport (Hobby Airport Station).

Private Right-of-Way/Mosley Road between Monroe Road and the Monroe Park and Ride (Segment E-4)

From a point approximately 400 feet west of Monroe Road, the alignment would continue east in an at-grade configuration to just east of Hansen Road. At this point, the at-grade alignment would begin to transition to an aerial configuration and fly over the southbound and northbound lanes of Interstate 45.

After crossing over Interstate 45, the alignment would continue on aerial structure and curve to the north to parallel the east side of the Mosley Road right-of-way. After crossing over Canniff Street and East Haven Boulevard on aerial structure, the alignment would begin to descend to grade on retained fill along the east side of Mosley Road. The alignment would transition to grade at approximately 800 feet north of Canniff Street where a terminus station and tail track would be provided.

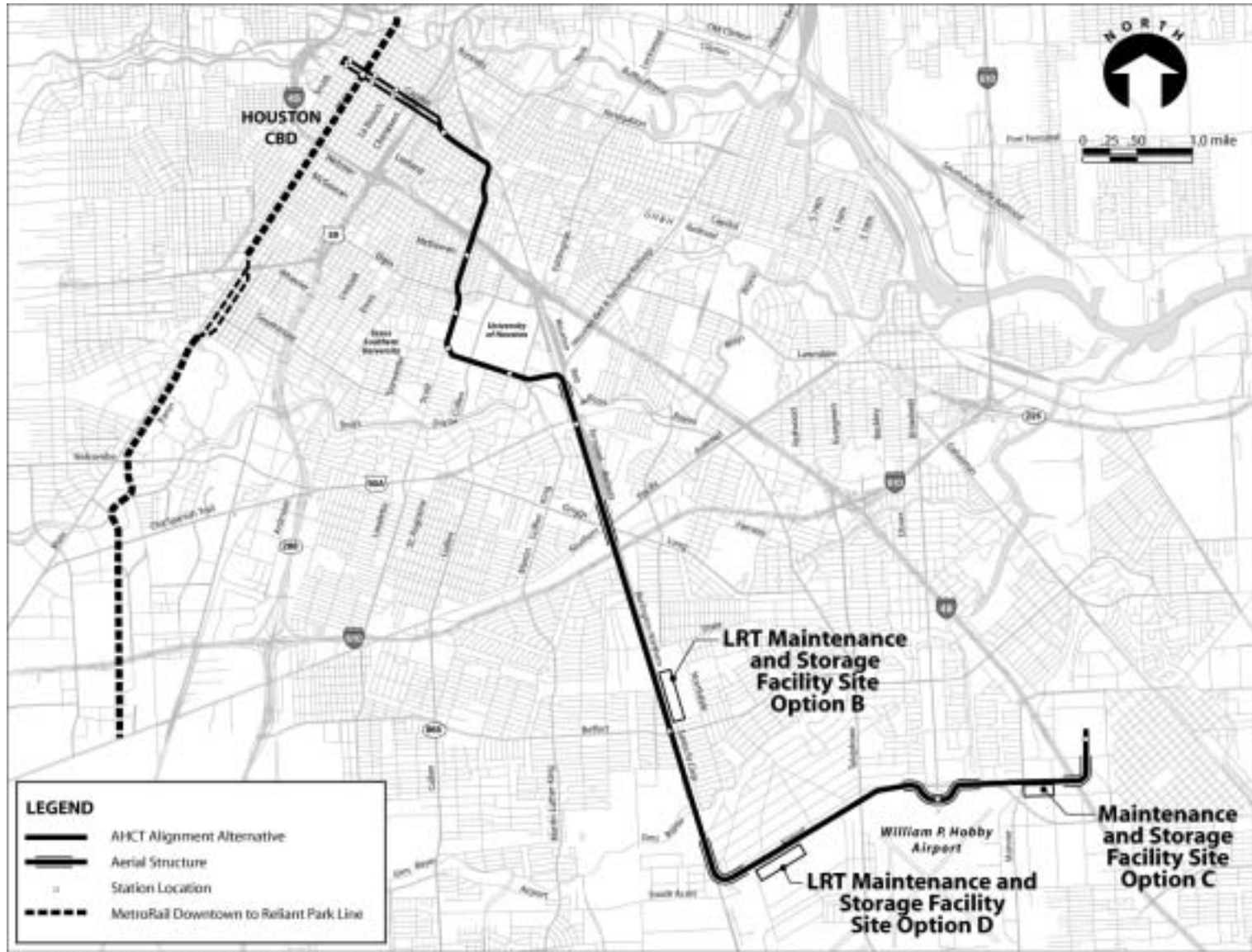
The one station in this segment would be located at the existing METRO Monroe Park and Ride lot (Monroe Park and Ride Station).

2.5.1.4 Alternative SL-4

The alignment for Alternative SL-4 would extend from a northern terminus at the Bagby/Smith Station in downtown Houston southeast to a new AHCT station at the existing METRO Monroe Park and Ride lot located on the east side of Interstate 45 north of Canniff Street. The total length of the Alternative SL-4 alignment is 14.0 miles. The alignment and station locations for this alternative are shown in Figure 2-22. The following text describes the BRT and LRT alternative alignment as it starts in the Houston central business district (Segments C and R) and continues south and east to its southern terminus at the Monroe Park and Ride Station (Segment E-4).

Capitol/Rusk Streets Between Bagby and Dowling Streets (Segments C and R)

The alignment for this segment begins in Rusk Street and Capitol Street at a station located in the block between Brazos and Smith. The alignment along Rusk and Capitol Streets would consist of a one-way couplet with one guideway on both Rusk Street and Capitol Street. From Bagby Street, the southbound (outbound) line would follow an at-grade



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alignment located in the north curb lane along Rusk Street to Dowling Street with four traffic lanes on the right hand side of the street.

Along Capitol Street, the northbound (inbound) line would be located in the south curb lane between Bagby and Dowling Streets with four traffic lanes on the right hand side of the street. BRT and LRT vehicles would operate with the flow of traffic on both streets since Rusk Street is one-way eastbound and Capitol Street is one-way westbound. Operations would be turned around with a single connecting line in Bagby Street between Capitol and Rusk Streets.

One existing travel lane would be removed from both Capitol and Rusk Streets to accommodate the AHCT lines within the existing right-of-way, which would reduce the total number of traffic lanes on each street from five to four.

Between Dowling and Bastrop Streets the northbound (inbound) line would transition from the one-way couplet configuration to a dual at-grade configuration at Dowling Street and continue to the Dowling/St. Charles Station in Segment S.

There are four stations proposed for this segment of the AHCT alignment. Three stations would be located in Capitol and Rusk Streets and would be comprised of two separate side platforms, one for the southbound (outbound) operations in Rusk Street and one for the northbound (inbound) operations in Capitol Street. The locations would include stations between Brazos and Smith Streets (Bagby/Smith Station), between Main and Fannin Streets (Main/Fannin Station), and between Crawford and Jackson Streets (Crawford/Jackson Station).

The fourth station in this segment would be a new LRT station on the METRORail Downtown to Reliant Park line. It would be located along Main Street between Capitol and Rusk Streets (Capitol/Rusk Station). The northbound lane on Main Street would be closed between Capitol and Rusk to accommodate the northbound LRT platform.

Walker/Scott Streets Between Dowling Street and Wheeler Street (Segment S-1 and S-2)

From the southeast corner of the intersection of Rusk with Dowling Street, the alignment would continue southeast in an at-grade configuration and enter the abandoned railroad right-of-way and continue to a station platform located diagonally within the block formed by Dowling, St. Charles, Rusk, and Walker Streets. The alignment would then curve to the east through the St. Charles/Walker Street intersection and transition into an at-grade alignment in the middle of Walker Street and continue to Ennis Street. One lane of traffic in each direction would be maintained on Walker Street between St. Charles Street and Ennis Street with the AHCT line operating in an exclusive median.

At Ennis Street, the existing traffic lanes on Walker Street end at a three-way intersection. At this point, the alignment would transition from the middle of the Walker right-of-way to parallel the south side of the existing railroad tracks and continue in this configuration to Scott Street. The line would utilize the unused portion of existing right-of-way and would also require acquisition of additional right-of way and relocations along the south side of the Walker Street right-of-way.

At the intersection of the Walker Street right-of-way and Scott Streets, the alignment would turn south and continue in an at-grade configuration in the middle of Scott Street to Interstate 45. The existing median width of 30 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the existing two lanes of traffic in each direction.

After crossing underneath Interstate 45, the alignment would continue in the middle of Scott Street to Elgin Street. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing six lanes of traffic and the dual AHCT line. To accommodate the

AHCT line, two travel lanes in each direction would be eliminated with the AHCT line operating in an exclusive median.

From the Elgin Street intersection, the alignment would continue south at-grade in the median of Scott Street to the intersection of Cleburne Street where this segment would end. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing four lanes of traffic and the dual AHCT line. To accommodate the AHCT line, one travel lane in each direction would be eliminated and the existing median width, which varies from 0 feet to 12 feet, would be widened to allow the AHCT line to operate in an exclusive median.

There are three stations proposed for this segment of the AHCT alignment. The first station in this segment would be located in the abandoned railroad right-of-way between Dowling and St. Charles Streets (Dowling/St. Charles Station). Two additional stations would be located in Scott Street at McGowan Street (Scott at McGowan Station), and at Holman Street (Holman Street Station).

Wheeler Street Between Scott Street and Martin Luther King Boulevard (Segment U-3)

At the intersection of Cleburne Street and Scott Street, the alignment would leave the median of Scott Street and curve to the southeast to a station located at the University of Houston Robertson Stadium parking lot. Continuing from the Scott Street Station, the alignment would curve back to the east through the intersection of Cougar Place and Wheeler Street and transition to the middle of Wheeler. This section of the alignment between Scott and Wheeler alignment would require acquisition of private right-of-way to accommodate the AHCT line and station.

The alignment would continue along the middle of Wheeler Street to the intersection of Martin Luther King Boulevard where this segment would end. The curb-to-curb width on Wheeler would be widened from 37 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would continue to be provided with the AHCT line operating in an exclusive median.

There are two stations proposed for this segment of the AHCT alignment: at the University of Houston Robertson Stadium (Scott Street Station), and in Wheeler Street at University Oaks Boulevard (University Oaks Station).

Burlington Northern Sante Fe Railroad Between Wheeler Street and Airport Boulevard (Segment N)

From the intersection of Wheeler Street and Martin Luther King Boulevard, the alignment would continue east in the median of Wheeler and cross the frontage roads to the future extension of State Highway 35. The alignment would then curve to the south and enter the Burlington Northern Sante Fe Railroad right-of-way west of the existing tracks.

The AHCT alignment would be located parallel to the existing freight railroad tracks, which would not be relocated. A 27-foot center-to-center spacing would be provided between the northbound LRT track/BRT lane and the adjacent Burlington Northern Sante Fe Railroad track. A clear distance of 16 feet would be provided from the centerline of existing freight track to the proposed fencing separating the freight and proposed AHCT operations.

The alignment would continue south and cross over Brays Bayou and Old Spanish Trail on a new bridge structure. After crossing over Old Spanish Trail, the alignment would continue south in the railroad right-of-way in an at-grade configuration and parallel the alignment of the existing tracks to a point 1,150 feet north of Griggs Road.

At this point, the at-grade alignment would begin to transition to an aerial configuration and then cross over the Southern Pacific Railroad, Griggs Road, and Long Drive on aerial structure. The alignment would then begin to descend to grade on retained fill within the Burlington Northern Santa Fe Railroad right-of-way between the westerly track and Mykawa Road. After transitioning to an at-grade configuration just north of Interstate 610, the alignment would proceed south and cross under Interstate 610.

The alignment would continue south in the Burlington Northern Santa Fe Railroad right-of-way an at-grade configuration and follow the existing railroad of the roadway to a point 1,550 feet north of Airport Boulevard. At this point, the at-grade alignment would begin to transition to an aerial configuration, curve to the east and fly over to the Burlington Northern Santa Fe Railroad and the northbound lanes of Airport Boulevard.

After crossing over the Burlington Northern Santa Fe Railroad and northbound lanes of Airport Boulevard, the alignment would begin to descend to grade on retained fill within the median of Airport Boulevard. After transitioning to an at-grade configuration in the existing median just east of Fauna Street this segment would end.

There are three stations proposed for this segment of the AHCT alignment: BNSF Railroad south of OST (South of OST Station), BNSF Railroad south of Dixie (South of Dixie Station), and BNSF Railroad north of Belfort (North of Belfort Station).

Airport Boulevard between Burlington Northern Santa Fe Railroad and Hobby Airport (Segments E-1 and E-2)

From the east end of the flyover of the Burlington Northern Santa Fe Railroad, the alignment would continue east in an at-grade configuration in the middle of Airport Boulevard to a point approximately one eighth of a mile east of the Fauna Street and Airport Boulevard intersection. The existing median width of 30 feet in this section is of sufficient width to accommodate the dual AHCT line while maintaining the existing two lanes of traffic in each direction.

At this point, the at-grade alignment would begin to transition to an aerial configuration, and then cross over to the south side of Airport Boulevard, where it would proceed east along the south side of Airport Boulevard, crossing over the Airport Loop Road and airport parking lots to just west of the Hobby Airport Station. This section of the alignment between Airport Boulevard and Hobby Airport would require acquisition of private right-of-way to accommodate the AHCT line and station.

There would not be any stations within this segment of the alternative.

Airport Boulevard Between Hobby Airport and Monroe Road (Segment E-3)

From the Hobby Airport Station, the aerial alignment would curve to the northeast, cross over the Airport Loop Roads and the eastbound lanes of Airport Boulevard and then curve to the east and transition to the median of Airport Boulevard. The alignment would continue on aerial structure in the median of Airport Boulevard until crossing over Glencrest Street. After crossing over Glencrest Street, the alignment would begin to descend to grade on retained fill within the median of Airport Boulevard.

After transitioning to an at-grade configuration within the median of Airport Boulevard near Ruthby Street, the alignment would proceed in the median at the same line and grade as the existing roadway to Hinman Street. At Hinman Street, the alignment would curve to the northeast and cross the westbound lanes of Airport Boulevard and proceed in an at-grade configuration to a point approximately 400 feet west of Monroe Road where this segment would end.

The one station proposed for this segment of the AHCT alignment is the aerial station at Hobby Airport (Hobby Airport Station).

Private Right-of-Way/Mosley Road between Monroe Road and the Monroe Park & Ride (Segment E-4)

From a point approximately 400 feet west of Monroe Road, the alignment would continue east in an at-grade configuration to just east of Hansen Road. At this point, the at-grade alignment would begin to transition to an aerial configuration and fly over the southbound and northbound lanes of Interstate 45.

After crossing over Interstate 45, the alignment would continue on aerial structure and curve to the north to parallel the east side of the Mosley Road right-of-way. After crossing over Canniff Street and East Haven Boulevard on aerial structure, the alignment would begin to descend to grade on retained fill along the east side of Mosley Road. The alignment would transition to grade at approximately 800 feet north of Canniff Street where a terminus station and tail track would be provided.

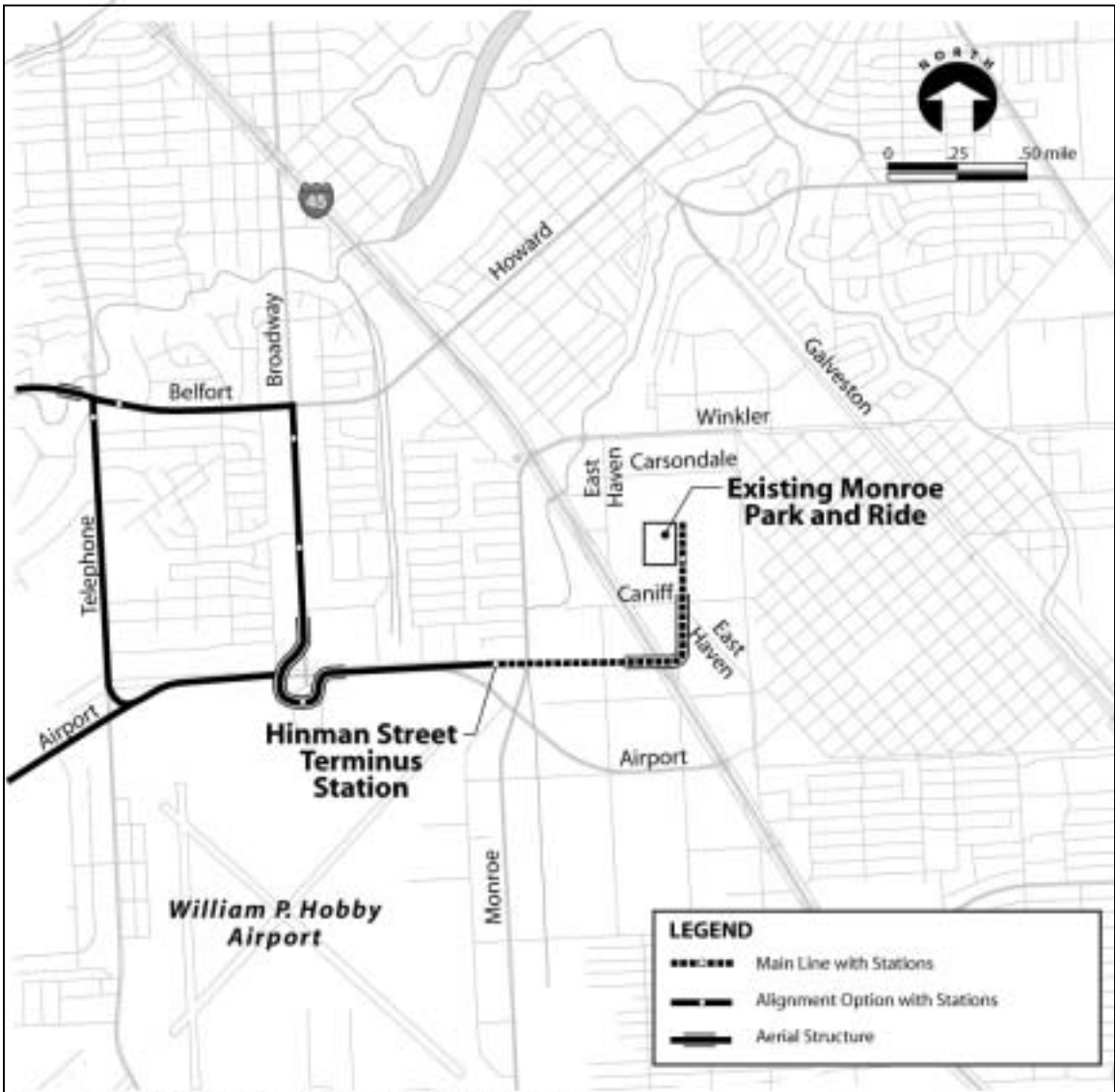
The one station in this segment would be located at the existing METRO Monroe Park and Ride lot (Monroe Park & Ride Station).

2.5.1.5 Hinman Street Alignment Option

The Hinman Street option provides an alternative southern terminus location for the four alternative alignments. Under this option, the southern terminus of the main alternative alignments would be shortened by approximately 1.1 miles with a terminus station located in the northeast quadrant of the Airport Boulevard and Hinman Street intersection as opposed to the terminus station at the existing METRO Monroe Park and Ride lot on the east side of Interstate 45 north of Canniff Street. In addition to the station at Hinman, storage tracks, turnback facilities and a park and ride lot would be constructed at this interim terminal station.

The alignment for this option would follow the same alignment as Segment E-3. From the Hobby Airport Station, the aerial alignment would curve to the northeast, cross over the Airport Loop Roads and the eastbound lanes of Airport Boulevard and then curve to the east and transition to the median of Airport Boulevard. The alignment would continue on aerial structure in the median of Airport Boulevard until crossing over Glencrest Street. After crossing over Glencrest Street, the alignment would begin to descend to grade on retained fill within the median of Airport Boulevard. After transitioning to an at-grade configuration within the median of Airport Boulevard near Ruthby Street, the alignment would proceed in the median at the same line and grade as the existing roadway to Hinman Street. At Hinman Street, the alignment would curve to the northeast and cross the westbound lanes of Airport Boulevard and proceed in an at-grade configuration to a point approximately 400 feet west of Monroe Road where this alignment option would end.

The one station proposed for this segment of the AHCT alignment is the at-grade, center platform station and park and ride lot located north of Airport Boulevard and east of Hinman Street (Hinman Street Station). The alignment and station locations for this alignment option are shown in Figure 2-23.



U:\01\Hobby\QD-Houston SE Corridor 31084\A\Airport\Alternatives\Monroe Option Aerial Structure



2.5.1.6 Chenevert-Leeland Alignment Option

The Chenevert-Leeland Option represents an alternative service concept for downtown Houston for alternative alignments SL-1, SL-2, and SL-4. Under this option, the main alternative alignments in the east area of downtown Houston would be modified between Chenevert Street and Leeland Street to more directly serve the George R. Brown Convention Center and new multi-purpose arena. The alignment and station locations for this alignment option are shown in Figure 2-24.

Chenevert-Leeland Option for Alternative SL-1 (Segments W1 through W-4)

As an alternative to continuing east along Capitol and Rusk Streets throughout the Houston central business district, this alignment option would begin to diverge from the alternative alignments at a point just east of Jackson Street. At this point the alignments would turn south from Capitol and Rusk Streets and merge into a dual guideway configuration in the middle of Chenevert Street just south of Rusk Street. Private right-of-way would be acquired for construction of the single northbound (inbound) line in the block between Capitol and Rusk Streets.

The alignment would continue in this configuration to the intersection of Chenevert and Polk Streets. To accommodate the AHCT line, one travel lane in each direction would be eliminated from Chenevert and the existing median width, which is 10 feet in width, would be widened to 28 feet to allow the AHCT line to operate in an exclusive median.

At the intersection of Chenevert and Polk Streets, the alignment would curve to the southeast and then back to the southwest to follow the existing Chenevert Street alignment. The alignment would continue at-grade in the middle of Chenevert until the intersection with Leeland Street. The curb-to-curb roadway width on Chenevert would be widened from 34 feet to 48 feet to accommodate the AHCT line. One lane of traffic in each direction would remain with the AHCT line operating in an exclusive median.

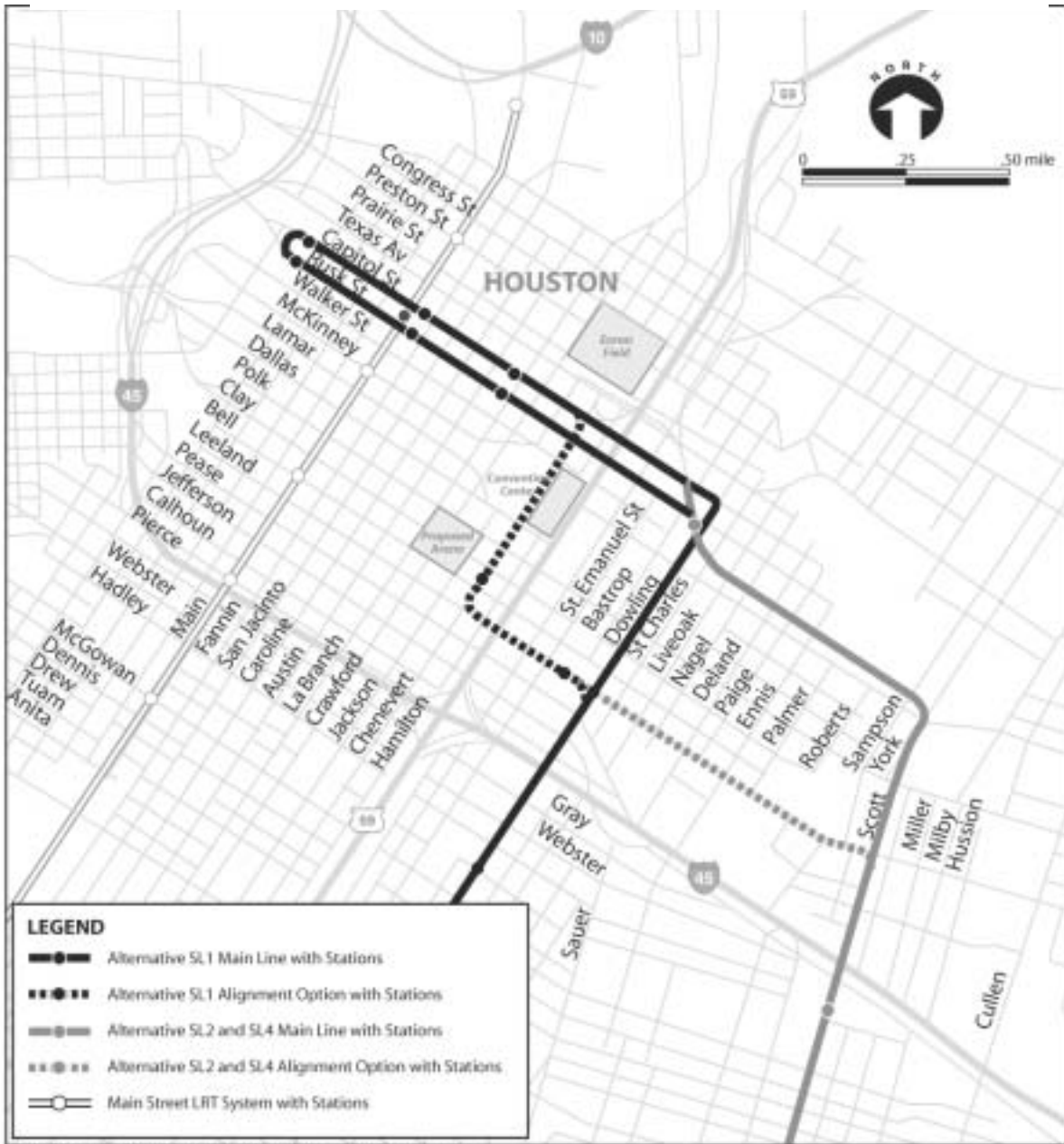
At the Leeland Street intersection, the alignment would turn to the east through the intersection and continue in an at-grade configuration in the middle of Leeland Street to Dowling Street where this alignment option for Alternative SL-1 would end. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing five lanes of traffic and the dual AHCT line. To accommodate the AHCT line within the existing right-of-way, three traffic lanes would be eliminated and a median would be constructed to allow the AHCT line to operate in an exclusive median. The total length of this option for Alternative SL-1 is 1.1 miles.

The two stations in this option would be located in Chenevert between Clay and Bell Streets (Clay/Bell Station) and in Leeland Street at Hutchins Street (Hutchins Street Station).

Chenevert-Leeland Option for Alternatives SL-2 and SL-4 (Segments W1 through W-3, and W-5)

This option represents an extension to the Alternative SL-1 option described above. From the Leeland Street intersection with Dowling Street, the alignment would continue in an at-grade configuration in the middle of Leeland Street to Scott Street where this alignment option for Alternative SL-2 and SL-4 would end.

The existing right of way width of 60 feet in this section is insufficient to accommodate the existing four lanes of traffic and the dual AHCT line. To accommodate the AHCT line within the existing right-of-way, one lane of traffic in each direction would be eliminated and a



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median would be constructed to allow the AHCT line to operate in an exclusive median. The total length of this option for Alternatives SL-2 and SL-4 is 1.7 miles.

The two stations in this option would be located in Chenevert between Clay and Bell Streets (Clay/Bell Station) and in Leeland Street at Hutchins Street (Hutchins Street Station).

2.5.1.7 LaBranch-Leeland Alignment Option

The LaBranch-Leeland Option is also an alternative service concept for the Houston central business district for alternative alignments SL-1, SL-2, and SL-4. Similar to the Chenevert-Leeland Option, the main alternative alignment in the east area of downtown Houston would be modified between LaBranch Street and Leeland Street to more directly serve the George R. Brown Convention Center and new multi-purpose arena. The alignment and station locations for this alignment option are shown in Figure 2-25.

LaBranch-Leeland Option for Alternative SL-1 (Segments Y, W-3 and W-4)

This alignment option would begin to diverge from the main alternative alignment just west of Caroline Street. At this point the southbound (outbound) alignment along Rusk Street would curve north from Rusk Street and merge into a dual guideway configuration in Capitol Street just east of Austin Street. Private right-of-way would be acquired for construction of the single southbound (outbound) line in the block between Caroline and Austin Streets.

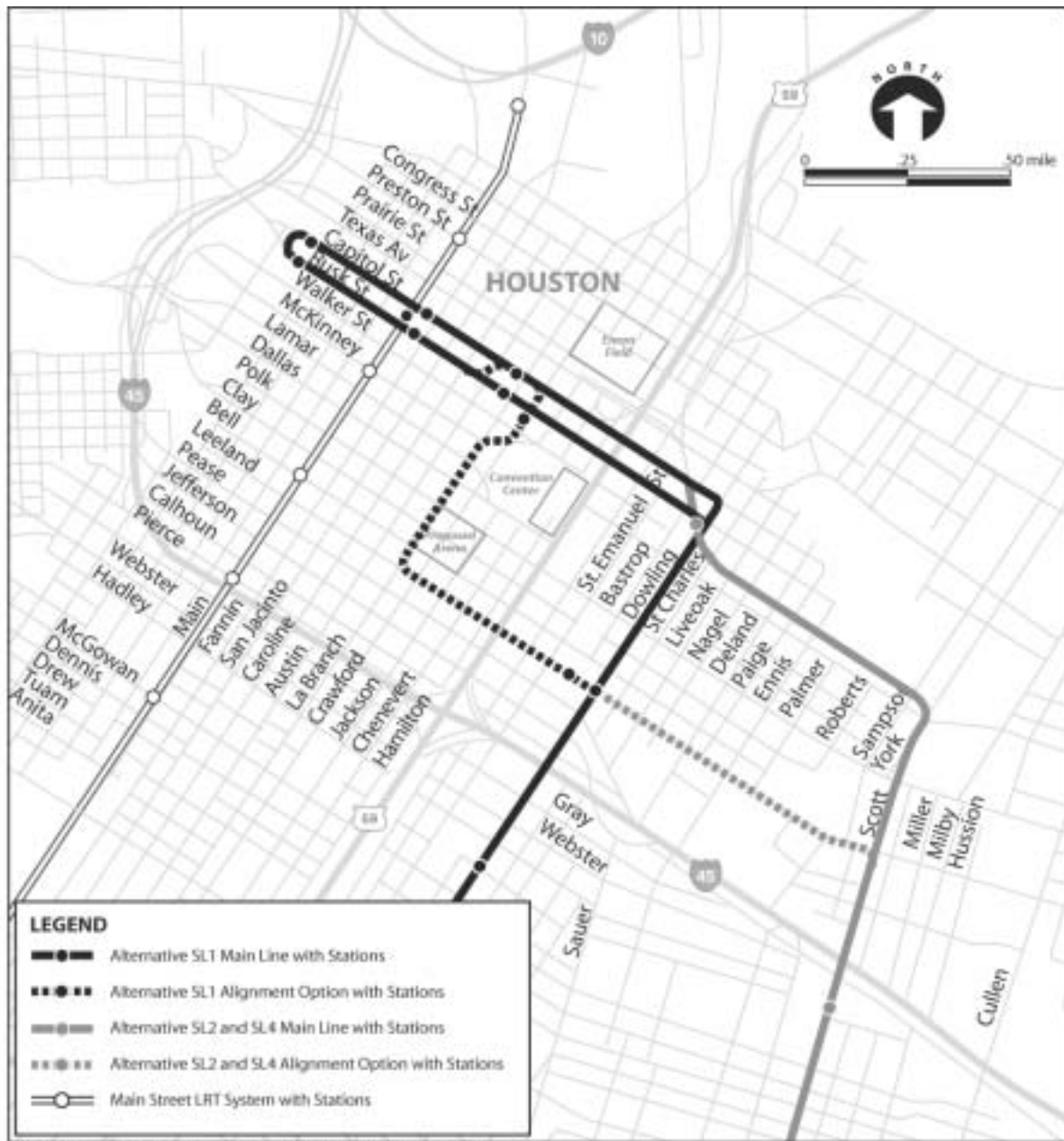
The alignment would continue in this configuration for two blocks to the intersection of Capitol and Crawford Streets. To accommodate the AHCT line within the existing right-of-way, two travels would be removed from Capitol Street.

At the intersection of Capitol and Crawford Streets, the alignment would turn south from Capitol Street into the middle of Crawford Street. The alignment would continue in this configuration to the McKinney Street intersection. At the intersection of McKinney and Crawford Streets, the alignment would curve to the southwest and then back to the south to transition to the middle of LaBranch Street. Private right-of-way would be acquired for construction of the line in the block between McKinney and Lamar Streets.

From the Lamar Street intersection, the alignment would continue at-grade in the middle of LaBranch until the intersection with Leeland Street. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing three lanes of traffic, two parking lanes and the dual AHCT line. To accommodate the AHCT line within the existing right-of-way, the parking lanes would be converted to travel lanes and one traffic lane would be eliminated and a median would be constructed to allow the AHCT line to operate in an exclusive median.

At the Leeland Street intersection, the alignment would turn to the east through the intersection and continue in an at-grade configuration in the middle of Leeland Street to Dowling Street where this alignment option for Alternative SL-1 would end. The existing right of way width of 80 feet in this section is insufficient to accommodate the existing traffic lanes and the dual AHCT line. To accommodate the AHCT line, only one traffic lane in each direction would be maintained and a median would be constructed to allow the AHCT line to operate in an exclusive median. The total length of this option for Alternative SL-1 is 1.1 miles.

The two stations in this option would be located in Crawford between Rusk and Walker Streets (Rusk/Walker Station) and in Leeland Street at Hutchins Street (Hutchins Street Station).



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Chenevert-Leeland Option for Alternatives SL-2 and SL-4 (Segments W1 through W-3, and W-5)

This option represents an extension to the Alternative SL-1 option described above. From the Leeland Street intersection with Dowling Street, the alignment would continue in an at-grade configuration in the middle of Leeland Street to Scott Street where this alignment option for Alternative SL-2 and SL-4 would end.

The existing right of way width of 60 feet in this section is insufficient to accommodate the existing four lanes of traffic and the dual AHCT line. To accommodate the AHCT line within the existing right-of-way, one lane of traffic in each direction would be eliminated and a median would be constructed to allow the AHCT line to operate in an exclusive median. The total length of this option for Alternatives SL-2 and SL-4 is 1.9 miles.

The two stations in this option would be located in Crawford between Rusk and Walker Streets (Rusk/Walker Station) and in Leeland Street at Hutchins Street (Hutchins Street Station).

2.5.2 Stations

The AHCT alternatives developed for the Southeast-Universities-Hobby Corridor would include stations for passenger access. The number, configuration, and location of stations are the same for the BRT and LRT technology options, but vary by alignment alternative. This section identifies the station locations for each alignment alternative and describes the different station types, platform configurations, and station facilities.

2.5.2.1 Station Locations

Table 2-13 contains a summary of the station locations and the characteristics of each station, including the name and nearest cross street location for each station, alternative alignments served by each location, station type and platform configuration for each location, and type and size of station facilities provided at each location. Alternative SL-1 would provide a total of 22 station locations. The locations would include terminal stations at the Bagby/Smith Street Station on the north end of the line and at the Hinman Street Station on the south end. One of these stations would be a new station along the METRORail Main Street line between Capitol and Rusk Streets.

Under Alternative SL-2, there would be a total of 24 station locations. Six of these stations would be located along the alignment from the Southeast Transit Center to the Texas Medical Center Transit Center. Similar to Alternative SL-1, the locations would include terminal stations at the Bagby/Smith Street Station on the north end of the line and at the Hinman Street Station or Monroe Station on the south end. One of these stations would be a new station along the METRORail Main Street line between Capitol and Rusk Streets.

Alternative SL-3 would provide a total of 15 station locations. The locations would include terminal stations at the Fannin/San Jacinto Station on the northwest end of the line and at the Hinman Street Station or Monroe Station on the southeast end. Alternative SL-4 would provide a total of 14 station locations. Similar to Alternatives SL-1 and SL-2, the locations would include terminal stations at the Bagby/Smith Street Station on the north end of the line and at the Hinman Street Station or Monroe Station on the south end. One of these stations would be a new station along the METRORail Main Street line between Capitol and Rusk Streets. The extension of the alignment to the Monroe Park and Ride would replace the Hinman Street Station as the terminal station in all four AHCT alternatives.

Table 2-13. Summary of Station Locations and Characteristics

Segment No.	Station Name	Station Location	Alternatives						Station Type		Platform Configuration		Station Facilities			
			SL-1	SL-2	SL-3	SL-4	Chenevert Leeland Option	LaBranch Leeland Option	Hinman St. Station Option	At-Grade	Aerial	Center	Side	Feeder Bus		Park-&-Ride Spaces
															On-Street	Off-Street
C	C-1	Bagby/Smith SB	Capitol between Bagby and Smith	✓	✓		✓				✓		✓	✓		0
		Main/Fannin SB	Capitol between Main and Fannin	✓	✓		✓				✓		✓	✓		0
	C-2	Crawford/Jackson SB	Capitol between Crawford and Jackson	✓	✓		✓					✓	✓		0	
	C-3	None														
	C-4	None														
	C-5	None														
R	R-1	Bagby/Smith NB	Rusk between Bagby and Smith	✓	✓		✓				✓		✓	✓		0
		Main/Fannin NB	Rusk between Main and Fannin	✓	✓		✓				✓		✓	✓		0
	R-2	Crawford/Jackson NB	Rusk between Crawford and Jackson	✓	✓		✓					✓	✓		0	
	R-3	None														
D	D-1	Leeland	Dowling at Leeland	✓							✓		✓	✓		0
	D-2	Dowling at McGowan	Dowling at McGowan	✓							✓		✓	✓		0
		Elgin	Dowling at Elgin	✓							✓		✓	✓		0
U	U-1	Fannin/San Jacinto	Underneath US 59 east of Fannin			✓					✓		✓	✓		0
		Cleburne East of Alameda	Cleburne East of Alameda			✓					✓		✓	✓		0
	U-2	Ennis	Cleburne at Ennis	✓		✓						✓	✓	✓		0
		Nettelton/Tierwester	Cleburne between Nettelton and Tierwester	✓		✓						✓	✓	✓		0
	U-3	Scott	East of Scott at Robertson Stadium	✓		✓	✓					✓			✓	0
		University Oaks	Wheeler at University Oaks	✓		✓	✓					✓		✓	✓	0
M	M-1	Winnetka/Arvilla (OST)	MLK between Winnetka and Arvilla	✓		✓					✓		✓	✓		0
		Griggs	MLK south of Griggs	✓							✓		✓	✓		0
	M-2	Southseas/Pershing	MLK between Southseas and Pershing	✓								✓		✓		0
		MLK/Southbank	NE quadrant of MLK Belfort intersection	✓								✓			✓	TBD

Segment No.	Station Name	Station Location	Alternatives								Station Type		Platform Configuration		Station Facilities		
			SL-1	SL-2	SL-3	SL-4	Chenevert Leeland Option	LaBranch Leeland Option	Hinman St. Station Option	At-Grade	Aerial	Center	Side	Feeder Bus		Park-&-Ride Spaces	
														On-Street	Off-Street		
B	B-1	West of Northdale	Belfort west of Northdale	✓							✓		✓		✓		0
		East of Plainview	Belfort east of Plainview	✓							✓		✓		✓		0
B	B-2	Belfort East of Telephone	Belfort east of Telephone	✓		✓					✓		✓		✓		0
		Broadway South of Belfort	Broadway south of Belfort	✓		✓					✓		✓		✓		0
P		South of Rockhill	Broadway south of Rockhill	✓		✓					✓		✓		✓		0
		E-1	None														
E	E-2	None															
		None															
	E-3	Hobby Airport	Airport Blvd. at Hobby Airport	✓	✓	✓	✓					✓	✓			✓	TBD
		Hinman Street	Airport Blvd. at Hinman							✓	✓		✓			✓	500
E-4	Monroe Park & Ride	East of Mosley at Monroe Park & Ride	✓	✓	✓	✓				✓		✓			✓	TBD	
S	S-1	Dowling/St. Charles	Between Rusk-Walker & Dowling-St. Charles		✓		✓				✓		✓		✓		0
	S-2	Scott at McGowan	Scott at McGowan		✓		✓				✓			✓	✓		0
		Holman	Scott at Holman		✓		✓				✓			✓	✓		0
	S-3	Wheeler	Scott at Wheeler		✓						✓			✓	✓		0
		Southmore	Scott at Southmore		✓						✓			✓	✓		0
G	G-1	Griggs/SETC	Griggs between Scott and OST		✓						✓		✓			✓	325
		East of Cullen	Griggs east of Cullen		✓						✓		✓		✓		0
	G-2	East of MLK	Griggs east of MLK		✓	✓					✓		✓		✓		0
L		East of Wayside	Long east of Wayside		✓	✓					✓		✓		✓		0
T	T-1	South of Long	Telephone south of Long		✓	✓					✓		✓		✓		0
	T-2	Telephone South of Belfort	Telephone south of Belfort		✓						✓		✓		✓		0
		Fauna East of Telephone	Fauna East of Telephone		✓						✓		✓		✓		0

Segment No.	Station Name	Station Location	Alternatives							Station Type		Platform Configuration		Station Facilities		
			SL-1	SL-2	SL-3	SL-4	Chenevert Leeland Option	LaBranch Leeland Option	Hinman St. Station Option	At-Grade	Aerial	Center	Side	Feeder Bus		Park-&-Ride Spaces
															On-Street	Off-Street
H	TMC Transit Center	Holcombe west of Fannin (LRT) or TMC Transit Center (BRT)		✓							✓		✓		✓	0
	Holcombe East of Bertner	Holcombe East of Bertner		✓							✓		✓	✓		0
	Holcombe West of Braeswood	Holcombe West of Braeswood		✓							✓		✓	✓		0
	Holcombe West of Alameda	Holcombe west of Alameda		✓							✓		✓	✓		0
	OST West of Tierwester	OST west of Tierwester		✓							✓		✓	✓		0
	Southeast Transit Center	North of OST at relocated SETC		✓							✓		✓		✓	TBD
N	South of OST	BNSF Railroad south of OST				✓					✓		✓	✓		0
	South of Dixie	BNSF Railroad south of Dixie				✓					✓		✓	✓		0
	North of Belfort	BNSF Railroad north of Belfort				✓					✓		✓	✓		TBD
W	W-1	None														
	W-2	Clay/Bell					✓				✓		✓	✓		0
	W-3	Hutchins					✓	✓			✓		✓	✓		0
	W-4	None														
	W-5	None														
Y	Rusk/Walker	Crawford between Rusk and Walker						✓			✓		✓	✓		0
	Capitol/Rusk	Main between Capitol and Rusk	✓	✓		✓					✓		✓	✓		0

The Chenevert/Leeland and LaBranch/Leeland alignment options would each include two stations for passenger access. The Chenevert/Leeland option would include stations along Chenevert Street between Clay Street and Bell Street and along Leeland Street at Hutchins Street. The LaBranch/Leeland alignment option would include stations along Crawford Street between Rusk Street and Walker Street and along Leeland Street at Hutchins Street.

2.5.2.2 Station Types and Platform Configurations

Station designs in the Southeast-Universities-Hobby Corridor would utilize various combinations of two different station types (i.e., at-grade and aerial) and platform configurations (i.e., center and side). Prototypical station concept designs have been developed for the following:

1. At-grade station with center platform
2. At-grade station with side platforms
3. Aerial station with center platform

The majority of the stations will be of the at-grade, center platform type design. The center platform design has a single platform located between dual guideways that flank the station platform. The platforms would be end-loaded and proper signal protection for the pedestrian crossings would be provided at each station. The platform would be 200 feet in length, a minimum of 16 feet in width, and depending upon the floor height of the low floor BRT or LRT vehicles specified, approximately 14 inches above the roadway profile grade or top-of-rail. The at-grade center platform type design is shown conceptually in Figure 2-26 through Figure 2-29.

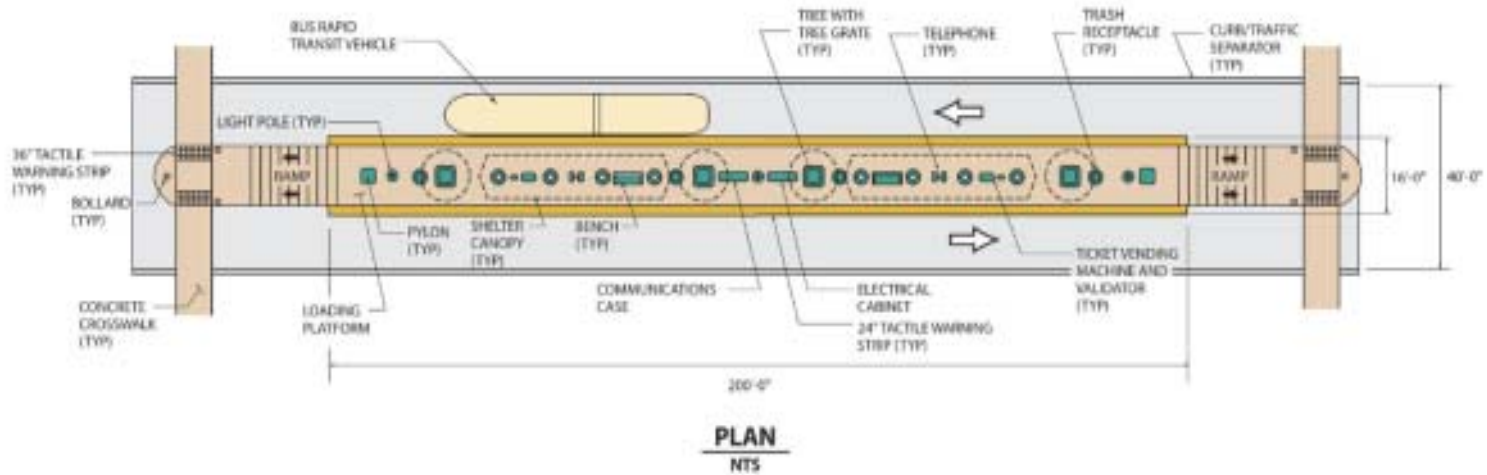
The at-grade, side-platform type design, as shown in Figure 2-30 through Figure 2-33 is proposed for several stations along the alternative alignments. The side platform type design has two platforms that flank the dual guideways located in the center of the station area. While the length would be the same as the center platform design, the width of the side platform station would be a minimum of 12 feet, which is narrower than the center platform station due to lower passenger volume requirements of the two side platforms. In some cases, side platforms are staggered, with one platform on each side of an adjacent intersection. In general these would be configured as far-side stations, and the corresponding near-side space would be used as a left-turn bay for street traffic.

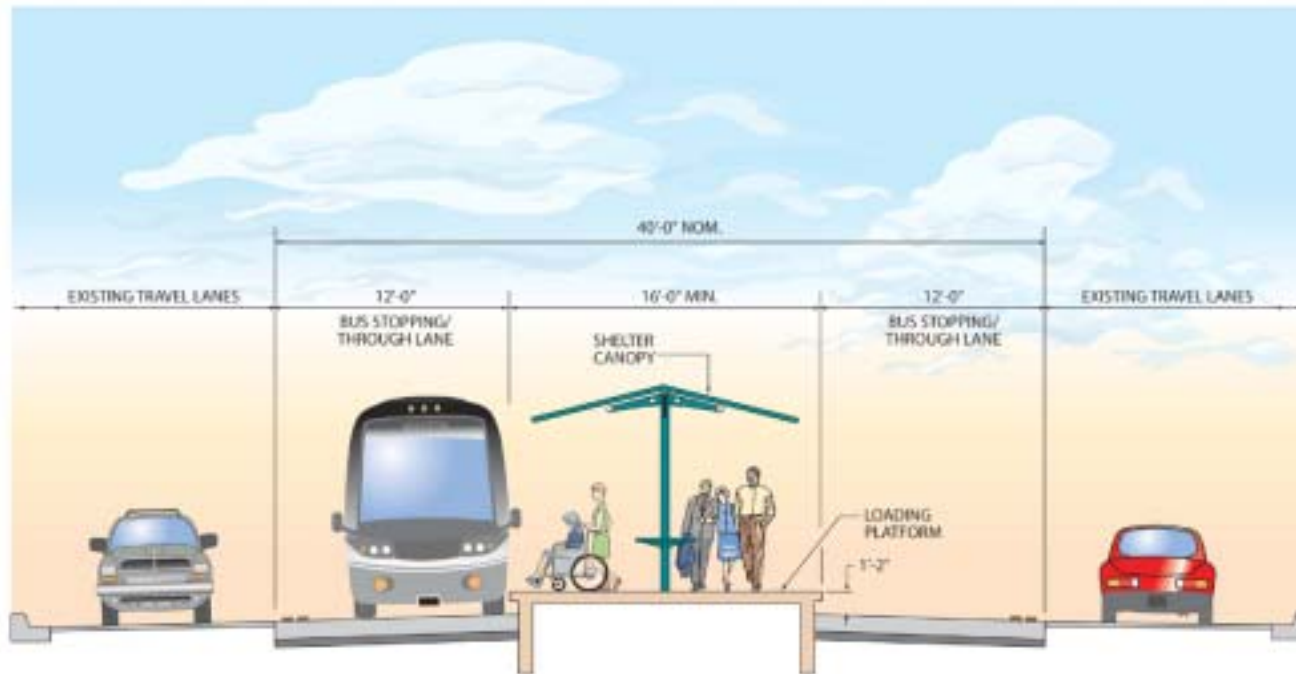
The other station design is the aerial center platform station, which would be used only at the Hobby Airport Station, as shown in the conceptual design. The need for an elevated station at this location may not exist if changes contemplated in the Airport Terminal area to conform with a near-complete Hobby Airport Master Plan are implemented within the time frame for AHCT construction. The length of the aerial center platform would be the same as the at-grade center platform design; however, the width would need to be increased to 27 feet, 6 inches to accommodate the required vertical circulation elements. The aerial center platform type design is shown conceptually in Figure 2-34 through Figure 2-37.

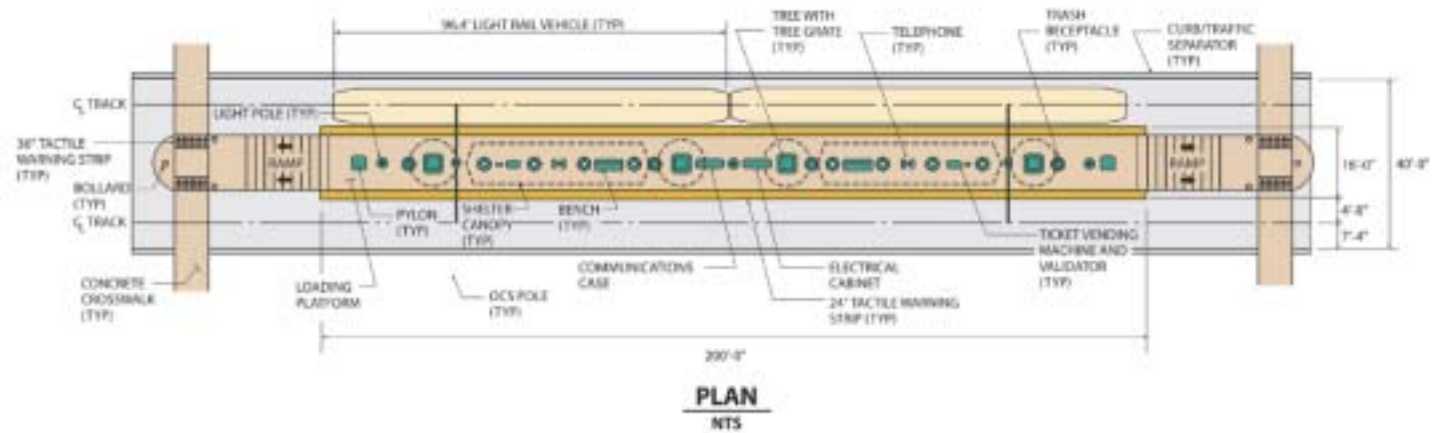
Other station configurations are possible and may be found preferable as design progresses past the current conceptual level.

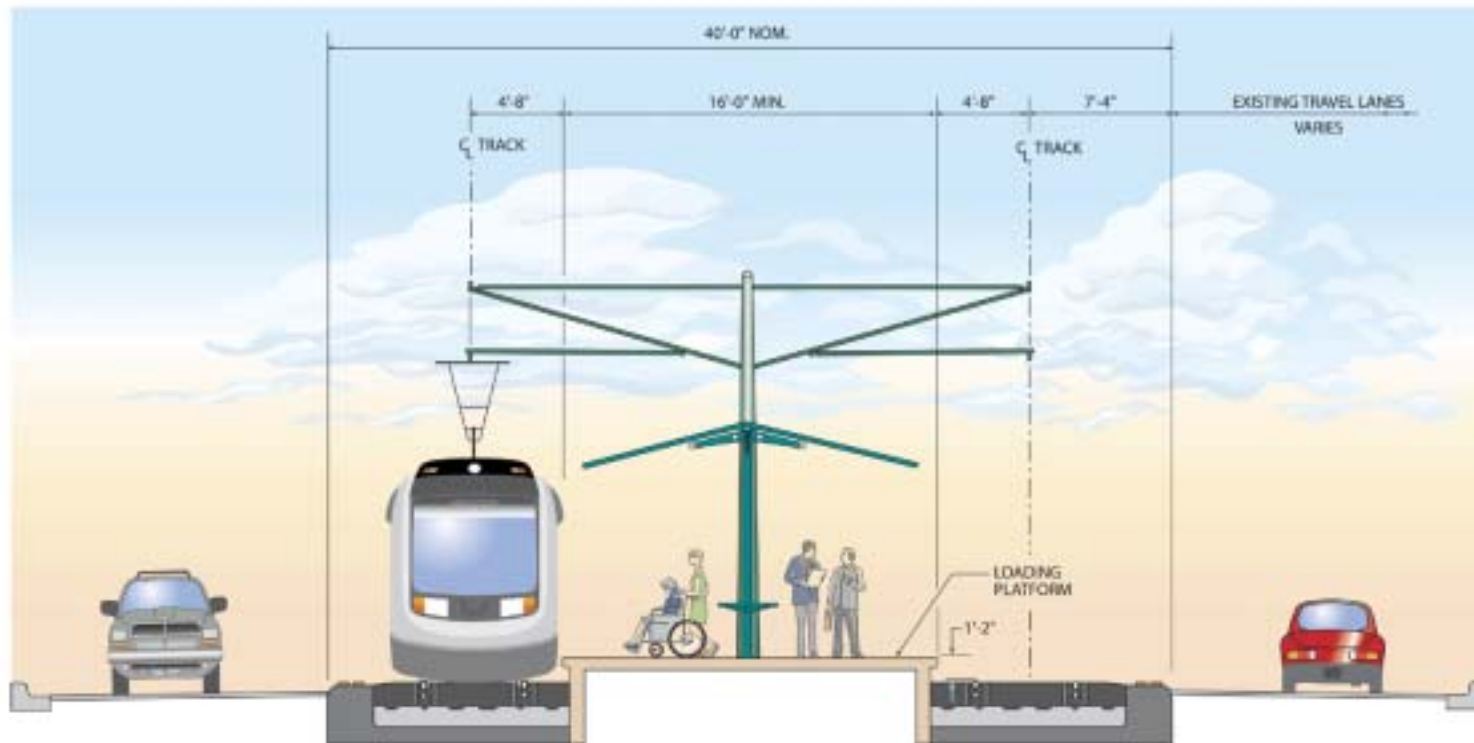
2.5.2.3 Station Facilities

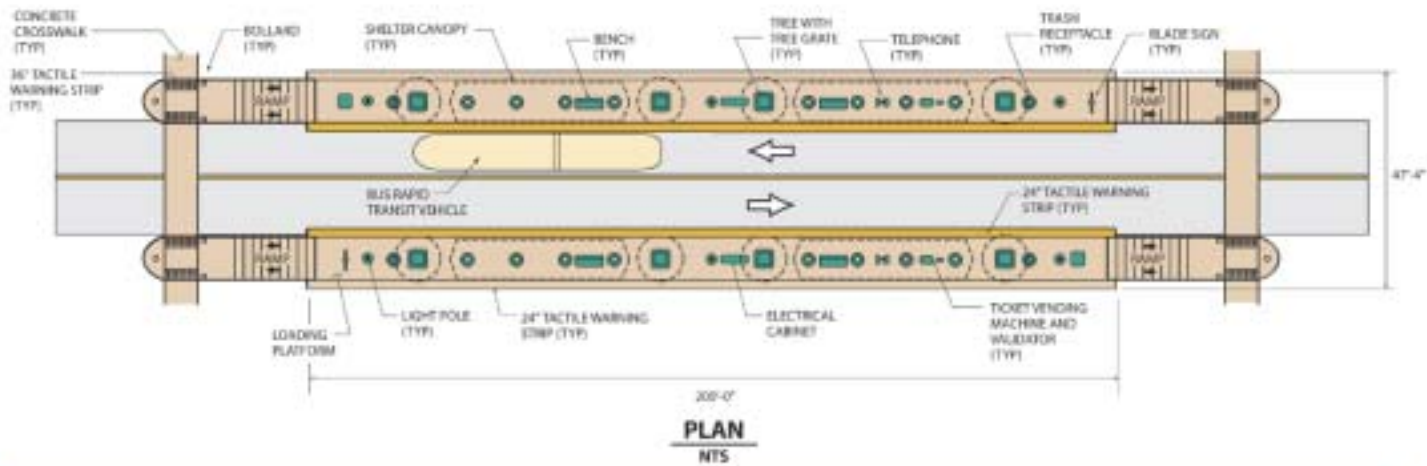
Facilities for passengers arriving by bus and auto will be provided at stations where demand by these modes is determined to exist and where land is available for location of these facilities.

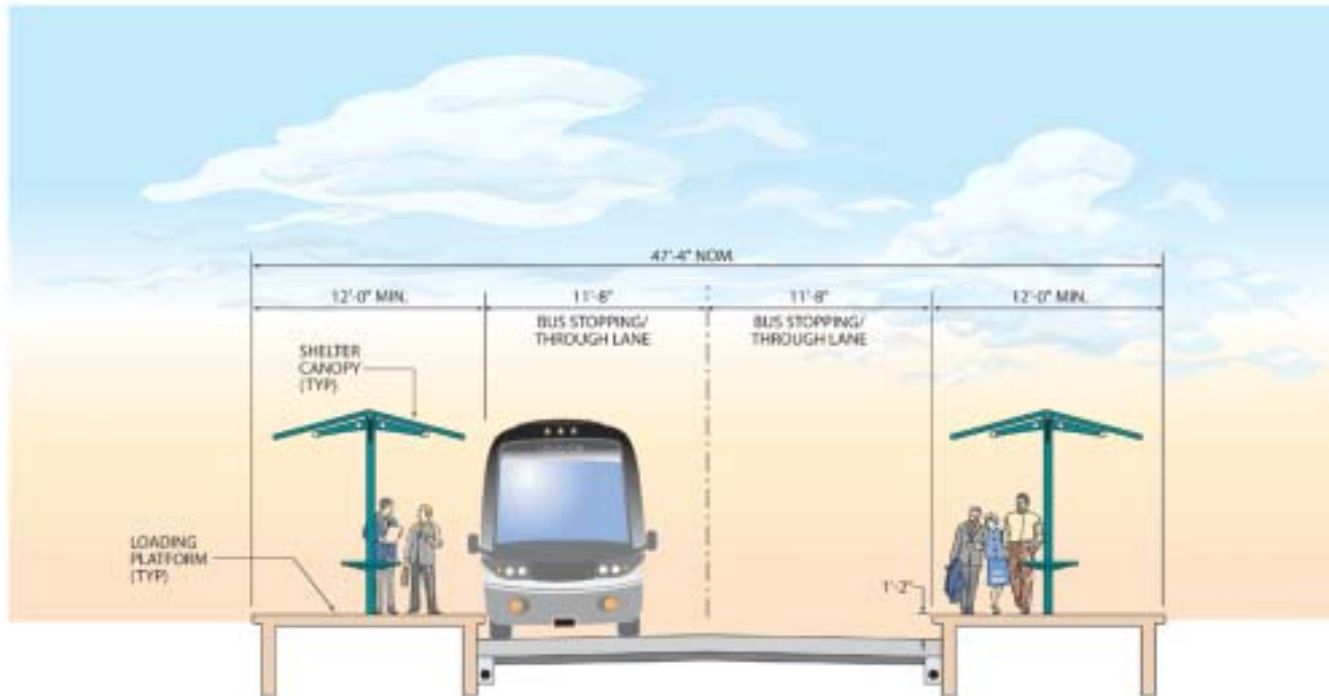


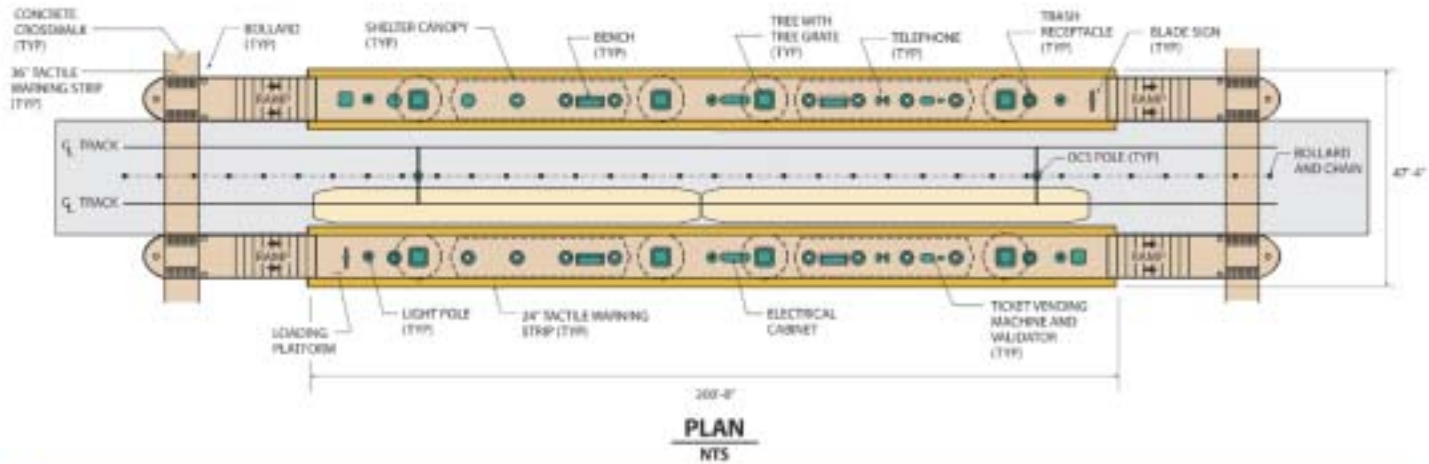






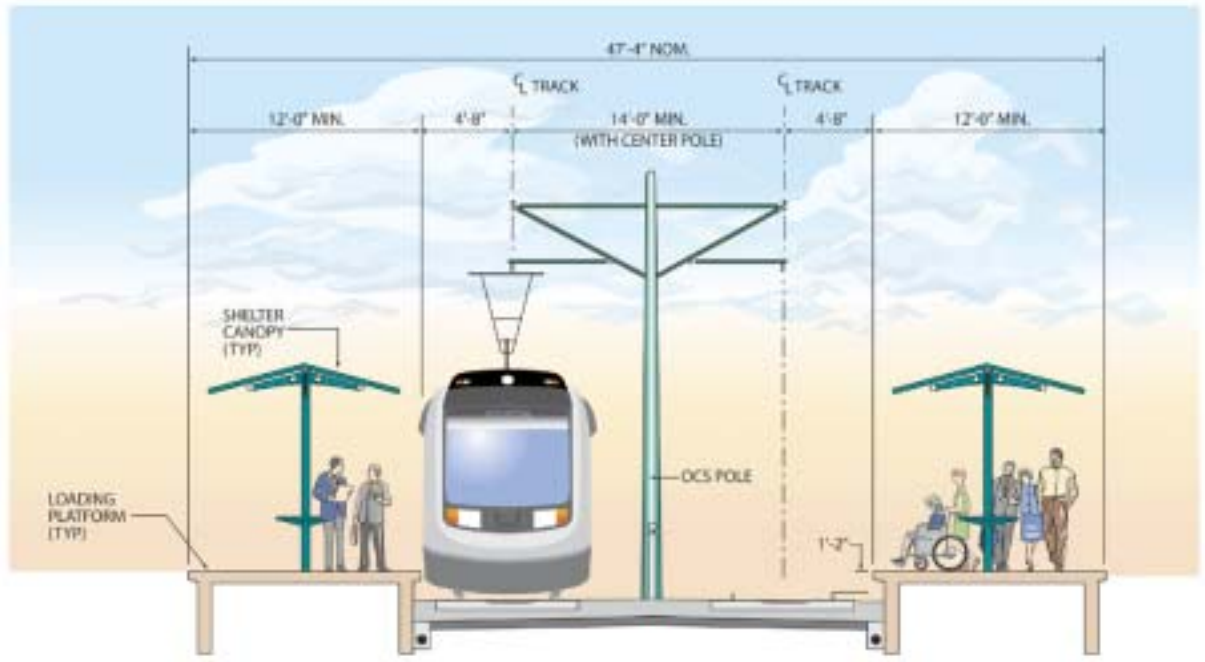


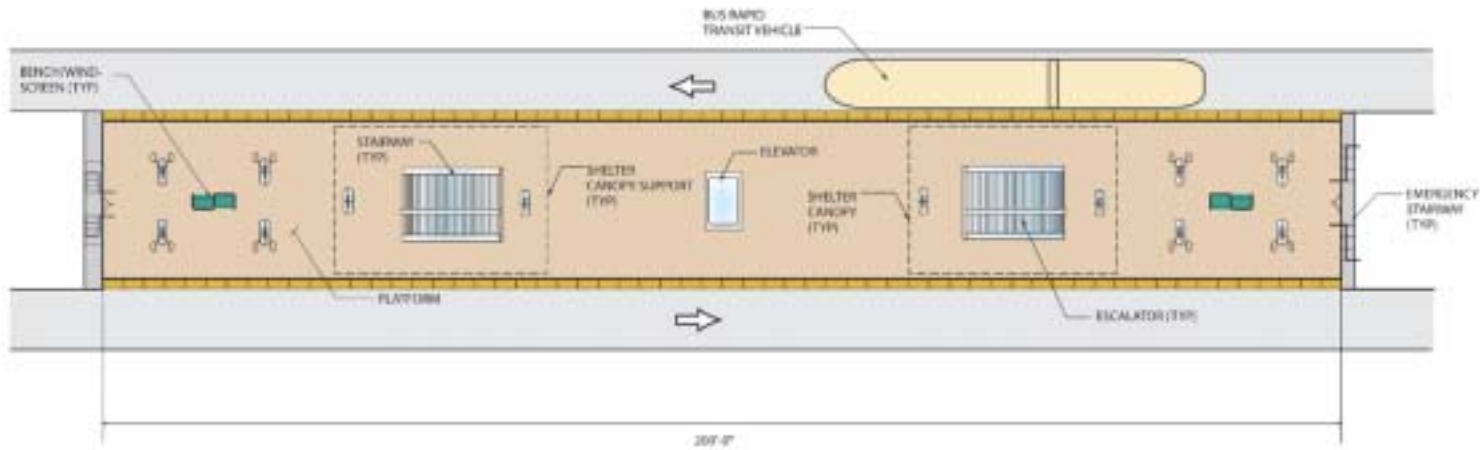




ELEVATION
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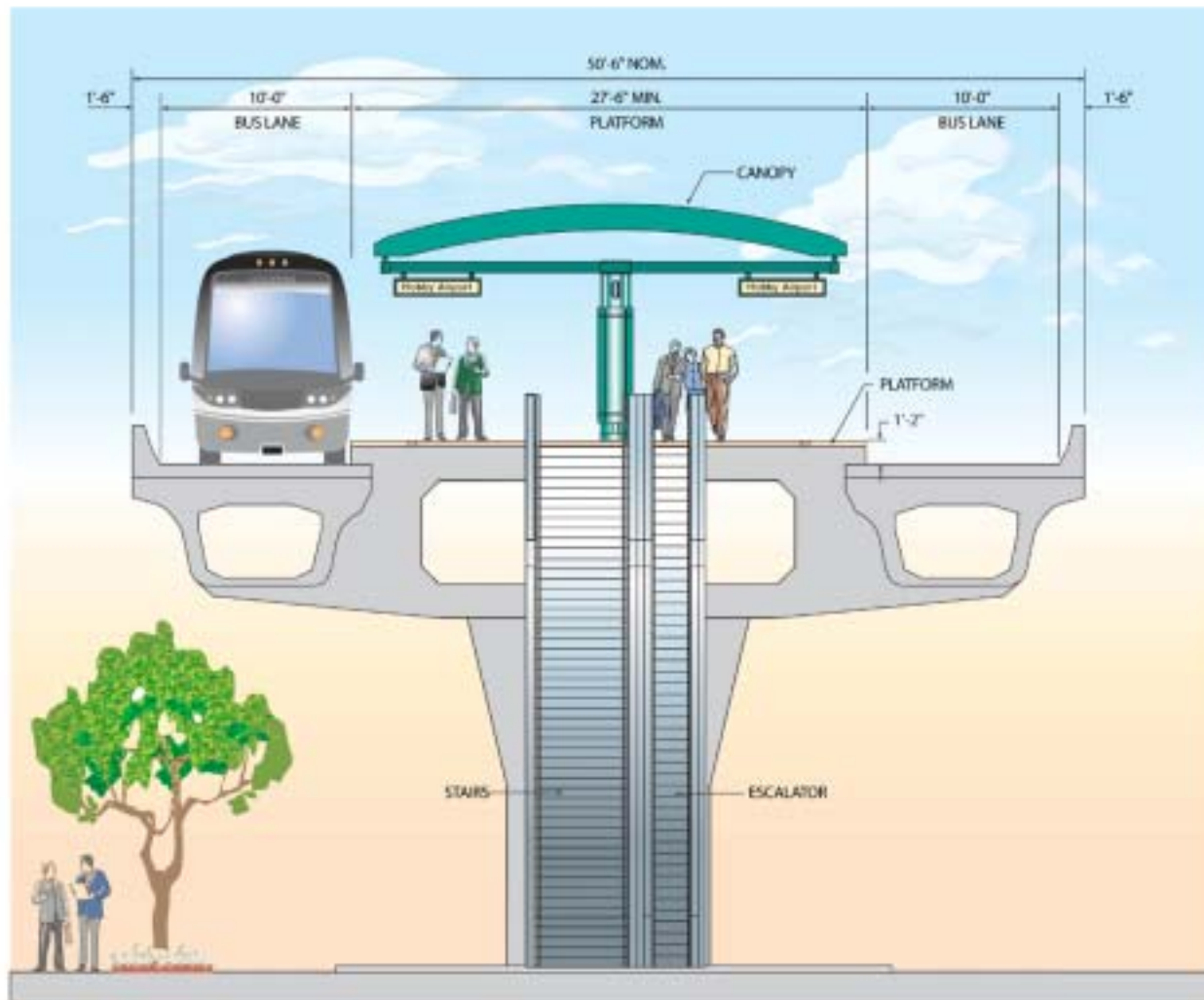


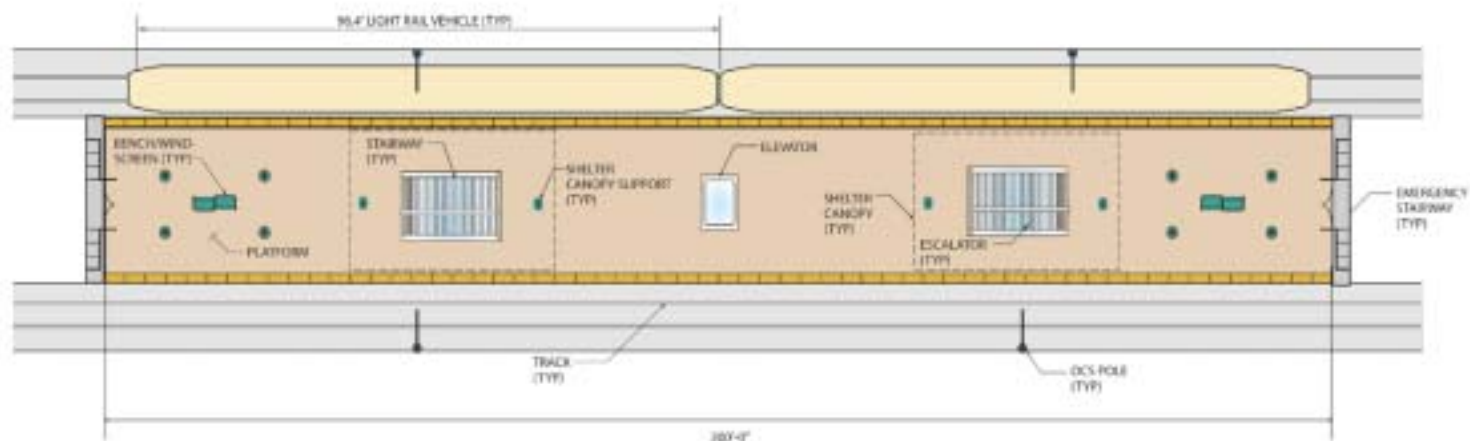
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ELEVATION
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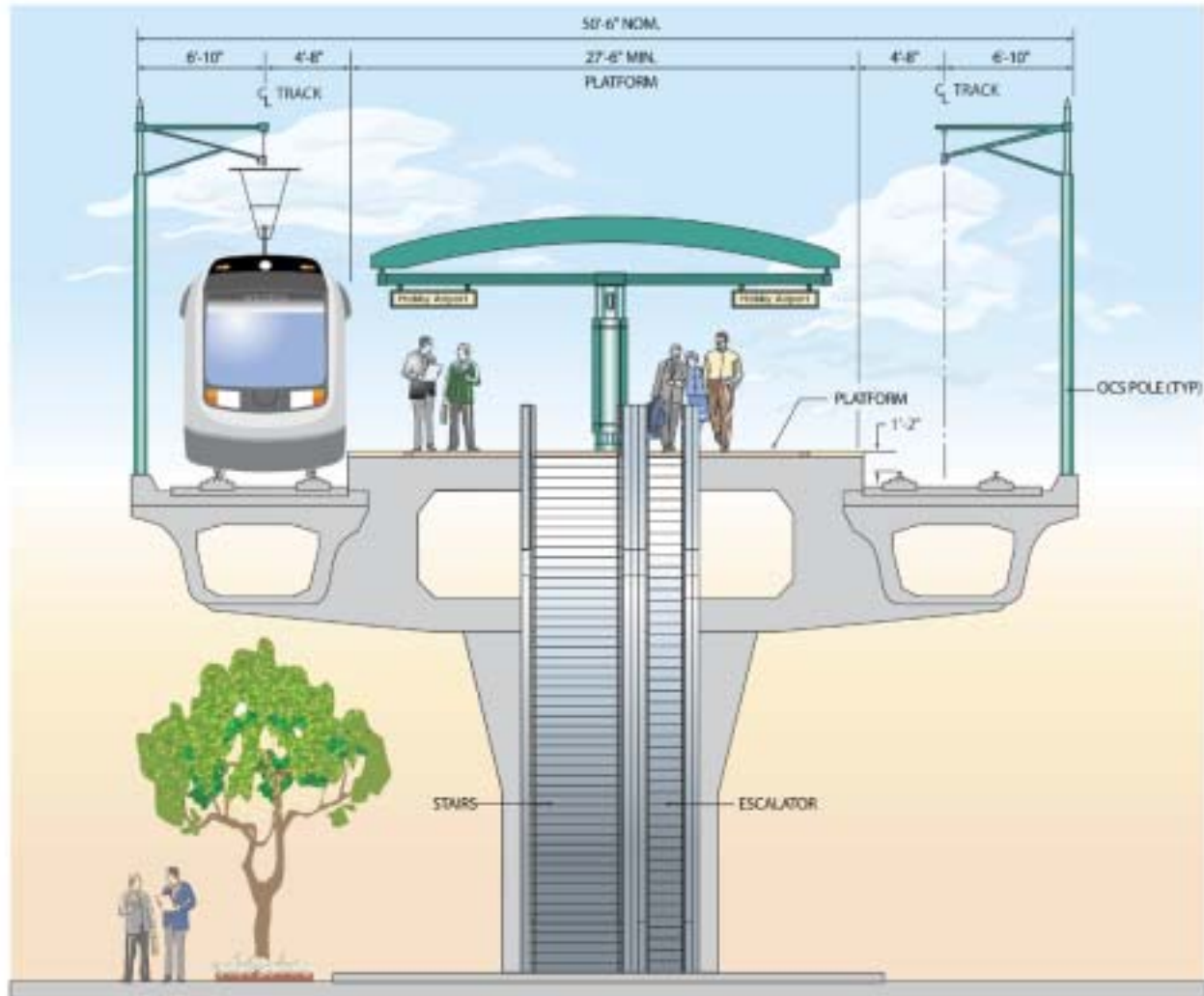


PLAN
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ELEVATION
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All stations in the Southeast-Universities-Hobby Corridor would have bus access. Off-street facilities for bus/AHCT transfers would be provided at the following stations:

- Scott Street
- Martin Luther King Boulevard/Southbank
- North of Belfort Station
- Griggs/Southeast Transit Center
- Hobby Airport
- Hinman Street Park and Ride or Monroe Park and Ride
- TMC Transit Center

On-street bus stops would be provided at all other stations in the Corridor.

Selected stations in the Southeast-Universities-Hobby Corridor would have parking facilities for the exclusive use of transit passengers arriving and departing by automobile. These facilities would include long-term spaces for passengers who park at the station (i.e., park & ride), and short-term spaces for passengers who are driven to the station and dropped off (i.e., kiss & ride). The demand for parking at stations will be based on the mode of access output from transit ridership forecasts, which are still under development. The sizes of the parking facilities will be developed as the parking demand estimates from the ridership forecasts become available.

The stations at Martin Luther King Boulevard/Southbank, North of Belfort, Griggs/Southeast Transit Center, Hinman Street, would all have new parking facilities. The station at The Monroe Park & Ride would be located adjacent to an existing park and ride facility.

2.5.3 Systemwide Facilities and Equipment

This section describes the systemwide facilities and equipment required to support operations of the AHCT alternatives for the Southeast-Universities-Hobby Corridor. It includes a description of the vehicles, maintenance and storage facilities, and other ancillary systemwide facilities and equipment.

2.5.3.1 Vehicles

Characteristics of the vehicles that would be used in the operation of the AHCT alternatives developed in the Southeast-Universities-Hobby Corridor are described in this section.

BRT Vehicle Characteristics

The BRT services described under the alternatives would be provided by low-floor, single articulated buses approximately 60 feet in length. The vehicle would meet all relevant Americans with Disabilities (ADA) accessibility policies and regulations and would provide for level boarding from low-level station platforms. The buses would have four passenger doors on each side of the vehicle to facilitate the loading and unloading of passengers at station platforms. The vehicles would have a maximum speed of 66 mph and other performance capabilities similar to typical U.S. transit articulated buses.

The BRT vehicles would accommodate not less than 90 passengers in a combination of seated and standing places. Each BRT vehicle would have an on-board operator who drives

the vehicle and adjust the speed in response to traffic conditions. BRT vehicle propulsion would be by clean-fuel internal combustion with mechanical or electric motor drive. Figure 2-38 shows the BRT vehicle concept and lists the characteristics of the proposed vehicle.

LRT Vehicle Characteristics

The light rail services described under the alternatives would be provided by light rail vehicles (LRVs) of a design equivalent to the Siemens Avanto vehicles being procured for the METRORail Downtown to Reliant Park line.

Service on the light rail alternatives would be provided by double-ended, articulated, six-axle LRVs capable of multiple unit operation in trains of up to four vehicles. Each vehicle would be approximately 96 feet, 4 inches in length over coupler faces and would have a maximum design speed of 66 miles per hour. Although capable of operation in trains of up to four vehicles, block lengths in the corridor would limit operations to two-car trains. The total length of a two-car train would be approximately 192 feet, 8 inches.

The LRV would be nominal 70 percent low floor, with high-floor areas at each end, and will have four passenger doorways per side. Each vehicle would have a seating capacity of a minimum of 72 passengers and could carry up to 200 passengers total. Each vehicle would be equipped for independent two-way operation with a driver's cab at each end and would be able to perform the same in both the forward and reverse direction. Electrical power needed to operate each vehicle would be drawn from an overhead contact system. Figure 2-39 shows the LRV concept and lists the characteristics of the vehicle that would be used.

2.5.3.2 Maintenance and Storage Facilities

BRT Maintenance and Storage Facilities

If BRT is the chosen transit technology it is anticipated that new bus maintenance facilities, as required, would be constructed as an extension of the existing bus maintenance and storage facilities that METRO currently operates.

LRT Maintenance and Storage Facilities

The METRORail LRV fleet size would increase considerably under the LRT technology alternatives and would require construction of a new light maintenance and storage facility to support operations of the LRT system in the corridor. The maintenance and storage facility would be used for secondary repair and maintenance for the light rail vehicles and as a storage area for vehicles that are not in service. Primary repair and heavy maintenance of the light rail vehicles would occur at the METRO maintenance and storage facility currently under construction at the south end of the METRORail Downtown to Reliant Park line between West Belfort and Holmes Road/Union Pacific Railroad.

Figure 2-40 shows a prototypical light maintenance and storage facility of the type required for the corridor. Some of the features and functions required at the maintenance and storage facility would include:

- Storage yard for the fleet of LRT vehicles;
- Circulation and lead tracks;
- Service and inspection shops, interior and exterior cleaning, light maintenance and repairs;



Vehicle Characteristics:

Length	60'-0"
Width (of body)	8'-6"
Width (with rear view mirrors)	10'-0"
Height	11'-2"
Ground Clearance:	
(under sprung components in the wheelbase)	7"
(under unsprung components in the wheelbase)	5"
Outside Turning Radius:	43.0'
Doors per Side	4
Ground to Low Floor Section	1'-2"
Door Clear Opening	2'-8"
Aisle Width	2'-9"
Gross Weight (lb.)	66,600
Axle Loadings (lb.):	
First Axle (P1)	14,600
Second Axle (P2)	26,000
Drive (Rear) Axle (P3)	26,000
Wheelbase:	
Front Axle to Center Axle	17'-7"
Center Axle to Rear Axle	22'-2"

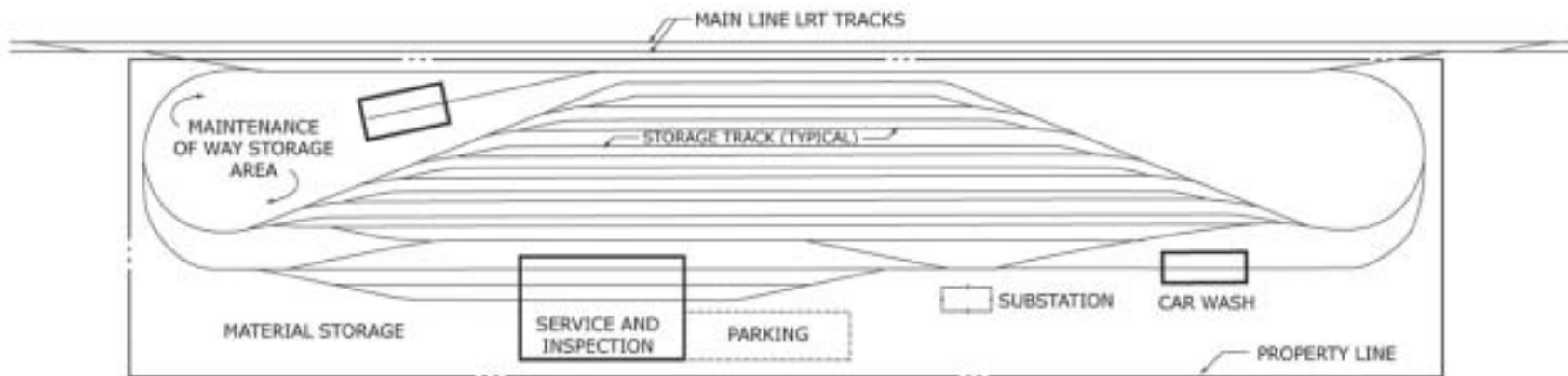




Vehicle Characteristics:

Length (over coupler faces)	96'-4"
Width (of body excluding rear view camera/mirrors)	8'-8"
Height of Roof	11'-8"
Undercar Clearance (above top of rail)	2"
Minimum Horizontal Curve Radius	82'-0"
Doors per Side	4
Floor Height (Above top of rail):	
Low Floor Section	1'-2" to 1"-5"
High Floor Section	2'-10"
Door Clear Opening	4'-3"
Aisle Width:	
Low Floor Section	2'-1"
High Floor Section	1'-10"
Maximum Vehicle Weight – AW4 (lb.)	136,475
Axle Loadings (lb.):	
End Truck Axles	20,618 max.
Center Truck Axles	27,000 max.
Wheelbase:	
Truck Spacing (centerline to centerline)	33'-6"





- Support facilities such as parts storage, building mechanical and electrical space, administration and records offices, maintenance shops, fare collection, employee locker and wash rooms, conference/training room, and lunch and vending rooms;
- Parking and circulation for employees and visitors;
- Train make up and yard dispatch; and
- Maintenance of LRT vehicles, track, and systems.

Several criteria must be taken into consideration in the selection and development of maintenance and storage facility sites. These include an evaluation of site location, configuration and size, potential for future expansion, and environmental impacts. Key site assessment parameters include:

- The site should be level, relatively rectangular or oblong, and large enough to accommodate the vehicle maintenance, vehicle storage, train washing facility, substation for traction power, stormwater retention, and employee and visitor parking.
- It should also be large enough to hold sufficient tracks to store and service the expected vehicle fleet, which may be as many as 37 vehicles depending on the alignment alternative and passenger demand. Required site dimensions include a minimum width of at least 350 feet and an overall area of at least 10 to 12 acres.
- It should either be surrounded by compatible land uses or be capable of being effectively screened from them. For example, a yard site adjacent to a residential neighborhood may be incompatible with community objectives, requiring noise walls, light screening, etc.
- It should be located either adjacent to the LRT main line or close enough to require only as short a non-revenue connection as possible to the main line. Placing the facility adjacent to the main line will minimize the length of non-revenue producing track to be built and facilitate operator relief.
- It should enjoy good access from highways and major surface streets for employees and delivery trucks; access should not require employees and delivery trucks to transverse a residential area.
- Railroad access to the site is desirable. The facility should be located on the same side of the railroad as the main line tracks to avoid the need for a grade separation of the yard leads or an interlocking which could result in service disruptions.

* The facility will require access to all major utilities.

For the LRT transit technology alternatives, four sites have been identified as potential light maintenance and storage facility locations. These sites are described below in Table 2-14, along with preliminary comments regarding their technical suitability. Chapter 3 of this report contains a preliminary environmental evaluation of each of the potential sites.

2.5.3.3 Other Facilities and Equipment

Other BRT Facilities and Equipment

Other systemwide facilities/equipment for the BRT alternatives include transit signal priority treatments and fare collection equipment as described below.

Table 2-14. Potential Light Maintenance and Storage Facility Sites

Site	Location Description	Alt. Served	Area	Characteristics / Notes
A	South side of Griggs and north of the Southern Pacific Railroad	SL-2 SL-3	Up to 22 acres	Partially developed site that could be assembled by acquisition of up to seven parcels. Site is adjacent to the Southern Pacific Railroad right-of-way, which could provide freight rail access. The triangular configuration of the available property would result in a somewhat inefficient use of the site for storage yard operations.
B	East side of the Burlington Northern Sante Fe Railroad north of Ridgeway	SL-1 SL-4	16 acres	Presently undeveloped site with difficult access. Access from the SL-1 alignment would require acquisition of 10 residential properties along Crosswell and lengthy lead tracks along Belfort. Access from the SL-4 alignment would require a grade separation over the BNSF RR. Freight rail service could be provided to the site from the BNSF RR.
C	East of Monroe Road and west of Hansen Road	SL-1 SL-2 SL-3 SL-4	12 acres	Presently partially developed. Hemmed in on two sides by industrial developments. Smallest of all candidate sites. No freight rail access. Good access to the site from the main line tracks.
D	South of Airport Boulevard between Kopman Drive and Villa Drive	SL-4	19 acres	Presently undeveloped site. No freight rail access. Good access to the site from the main line tracks.

Traffic Signal Control

Traffic signal control devices would be applied at all street and roadway intersections to ensure efficient movement of BRT vehicles along the alignment and provide protection of motorists, pedestrians, and bicyclists. At intersections through which BRT vehicles would operate, special signals would be provided to control their movement. The BRT signal heads would be physically separated from the traffic signal heads. They would be designed so as to display indications that are distinctive in themselves and do not resemble those displayed by conventional traffic signals.

Fare Collection

BRT fare collection would be off-vehicle utilizing a self-service, barrier-free, proof-of-payment fare collection system similar to that provided for LRT. Patrons riding the BRT system would be required to have proof of payment of the proper fare for presentation to roving fare inspectors. Payment of fare would be confirmed by possession of a valid pass, ticket, or transfer.

Ticket vending machines (TVMs) would be located near platform entrances at BRT stations. The TVM will be a microprocessor controlled coin or bill accepting machine capable of optionally accepting credit, debit, and stored value cards.

Other LRT Facilities and Equipment

Other systemwide facilities/equipment for the LRT alternatives include trackwork, traction power supply and distribution system, train control and signaling, communications, and fare collection as described below.

Trackwork

The trackbed would consist of continuously welded new 115 RE (115 lbs./yd.) rail, ballast, and cross ties. Concrete ties would be used on the main line and timber ties would be used in the yard. Open ballasted sections would be the preferred design for sections of the line in exclusive right of way. Embedded track would be installed wherever the trackway may be shared with rubber-tired vehicles. Special trackwork will be provided to facilitate operational flexibility and recovery.

Traction Power Supply and Distribution System

Traction power is the electrical power that supplies power to the LRT trains for their propulsion. The traction power would be distributed to the trains by an overhead catenary system. The system would consist of catenary support poles and a simple catenary system comprised of a single contact wire suspended by means of messenger wire and hangers. The type of poles specified would meet the aesthetic and structural needs of the system. The distribution system would be designed to be environmentally acceptable. Within the mechanical and structural design constraints, the system structures and associated equipment would be as lightweight as possible and will use visually unobtrusive fittings.

The traction power supply system would consist of electrical substations spaced at approximately one-mile intervals along the alignment. The substations would include all the equipment necessary to transform and rectify the utility AC voltage and current to DC electrification voltage and current and would generally be of the package-type design.

Signaling

In general, LRT train operation would be by line-of-sight operating rules and conventional railroad signaling will not be employed.

Signal components that will be employed in the unsignalized sections include; embedded type power switches for control and indication of certain crossover along the right-of-way, non-revenue type power switches for control and indication of certain yard lead turnouts at the maintenance and storage facility, traffic gates and flashing lights at certain street intersections, and systems to implement priority requests at intersections equipped with traffic signals.

Communications

The LRT communications system would include the following elements:

- Fiber optic cable transmission system
- Supervisory control and data acquisition (SCADA) system
- Radio communications system
- Closed-circuit television (CCTV) system
- Public address (PA) system
- Telephone/PBX System

Fare Collection System

The Southeast-Universities-Hobby Corridor line would use a proof-of-payment, barrier-free fare collection system similar to the one planned for the METRORail Downtown to Reliant Park line. This system requires that passengers board trains with a viewable proof-of-fare payment. Fares would be paid by purchasing tickets at stations from automatic fare vending machines. The vending machines would accept paper bills and dispense change. Passengers would board the vehicles without passing through barriers. Random inspections would be performed to protect against excessive fare evasion.

2.5.4 Operating Plans

The Future Baseline transit network is the beginning point for transit operating plans for the AHCT alternatives. The AHCT routes overlay a limited-stop service, which will complement but not generally eliminate the need for the local bus services within the corridor. The attraction of many of the longer transit passenger trips to AHCT will result in reduced use of local buses on routes that serve the same corridor, and in those cases, local bus headways will be lengthened. In other cases, local routes will be modified to provide a convenient transfer point between bus and AHCT, or express portions of routes may be withdrawn in favor of transfers to AHCT. An operations plan was produced for each of the four alternatives. The operations plan documents provide narrative route descriptions for AHCT and the bus routes, including both unchanged and revised Future Baseline routes. In addition, maps were prepared for AHCT and routes that are changed. The narrative descriptions of the bus routes include indication of bus-AHCT passenger transfer opportunities wherever they occur.

AHCT will operate a frequent service, generally every six minutes during peak periods, and, if ridership justifies, during the period between the morning and evening peaks. At other times of day, headways of ten to fifteen minutes are anticipated.

Running times for the AHCT alternatives were estimated based on characteristics of the alignments including station locations, curves and probable curve radii, maximum allowable speeds considering surrounding conditions, and anticipated effects of traffic signals or other traffic conflicts. The running times also incorporate typical in-service acceleration and deceleration rates for the vehicle technology being used, and typical dwell times at the passenger stations. The estimated running times, which were included in the operating plans, are as shown in Table 2-15 through Table 2-18. In all the alternatives, an option instead of continuing to an end station at the Monroe Park & Ride is to provide a Park & Ride station at Hinman, which would be located 0.65 mile east of the Hobby Airport Station, in vacant land just north of Airport Boulevard. Running time from the Hobby Airport Station to the Hinman Station would be 1.47 minutes.

2.5.5 Vehicle Requirements

Modifications to bus services to integrate appropriately with AHCT will result in reduction in fleet size for local services, although the overall improvement in transit service through the introduction of AHCT will result in increased transit ridership, in some cases increasing the need for local bus service (as feeders to AHCT). These effects will be quantified when travel demand forecasts are made using the detailed EMME-2 mode choice model later in the study process.

AHCT vehicle requirements also will be subject to refinement when travel demands are identified through application of the EMME-2 model. It is possible at this point, however, to establish fleet requirements based on the estimated AHCT running times and assumed peak period headways, together with initial assumptions regarding passenger loads.

If one assumes that single Light Rail Vehicles (LRVs) at six-minute headways will have sufficient capacity to carry peak hour peak direction passenger loads at the maximum load

Table 2-15. Alternative SL-1 – AHCT Station-to-Station Distances and Running Times
(Dwell times included)

Station Number	Station	Miles from Previous Station	Minutes from Previous Station
SL-1.01a and b	Bagby-Smith		
SL-1.02a and b	Main-Fannin	0.31	1.26
SL-1.03a and b	Crawford-Jackson	0.37	1.39
SL-1.04	Bell-Leeland	0.90	2.44
SL-1.05	McIlhenny-McGowan	0.59	1.72
SL-1.06	Elgin-Stuart	0.37	1.30
SL-1.07	Delano-Ennis	0.76	2.51
SL-1.08	Nettelton-Tierwester	0.50	1.54
SL-1.09	Scott-Cullen	0.42	1.51
SL-1.10	West of University	0.65	2.22
SL-1.11	Winnetka-Arvilla (OST)	0.84	2.44
SL-1.12	Griggs-Browncroft	0.79	2.04
SL-1.13	Southseas-Pershing	1.61	3.42
SL-1.14	MLK-Southbank	0.75	2.28
SL-1.15	West of Northdale	1.30	2.63
SL-1.16	East of Plainview	0.91	2.04
SL-1.17	Belfort East of Telephone	1.04	2.24
SL-1.18	Broadway South of Belfort	0.75	2.35
SL-1.19	South of Rockhill	0.44	1.53
SL-1.20	Hobby Airport	0.57	2.19
SL-1.21	Monroe Park & Ride	1.78	2.92
	Totals	15.66	41.98

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Table 2-16. Alternative SL-2 - AHCT Station-to-Station Distances and Running Times
(Dwell times included)

Station Number	Station	Miles from Previous Station	Minutes from Previous Station
SL-2.01a and b	Bagby-Smith		
SL-2.02a and b	Main-Fannin	0.31	1.26
SL-2.03a and b	Crawford-Jackson	0.37	1.39
SL-2.04	Dowling-St. Charles	0.54	1.73
SL-2.05	McGowan-Dennis	1.49	3.61
SL-2.06	Sanders-Holman	0.44	1.52
SL-2.07	Eagle-Wheeler	0.37	1.30
SL-2.08	Gertin-Southmore	0.59	1.73
SL-2.09	Griggs-SETC	0.74	2.30
SL-2.10	East of Cullen	0.45	1.46
SL-2.11	East of MLK	0.79	2.10
SL-2.12	East of Wayside	1.09	2.67
SL-2.13	South of Long	1.58	3.59
SL-2.14	Telephone South of Belfort	0.96	2.42
SL-2.15	Fauna East of Telephone	1.11	2.98
SL-2.16	Hobby Airport	0.71	1.82
SL-2.17	Monroe Park & Ride	1.78	2.92
	Totals	13.35	34.83
Limited-Stop Bus Route, Southeast TC-TMC TC			
SL-2.18	Southeast Transit Center		
SL-2.19	OST West of Tierwester	0.66	2.19
SL-2.20	Holcombe West of Alameda	1.27	3.01
SL-2.21	Holcombe East of MacGregor	0.55	1.74
SL-2.22	Holcombe East of Bertner	0.35	1.34
SL-2.23	TMC Tarnsit Center	0.29	1.76
	Totals	3.13	10.04
	Grand Totals	16.48	44.87

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Table 2-17. Alternative SL-3 - AHCT Station-to-Station
Distances and Running Times
(Dwell times included)

Station Number	Station	Miles from Previous Station	Minutes from Previous Station
SL-3.01	Fannin-San Jacinto (Wheeler LRT)		
SL-3.02	Cleburne East of Alameda	0.46	1.78
SL-3.03	Delano-Ennis	0.75	2.03
SL-3.04	Nettelton-Tierwester	0.50	1.54
SL-3.05	Scott-Cullen	0.42	1.51
SL-3.06	West of University	0.65	2.22
SL-3.07	Winnetka-Arvilla (OST)	0.84	2.44
SL-3.08	East of MLK	0.79	2.47
SL-3.09	East of Wayside	1.09	2.67
SL-3.10	South of Long	1.58	3.59
SL-3.11	Belfort East of Telephone	0.96	2.48
SL-3.12	Broadway South of Belfort	0.75	2.39
SL-3.13	South of Rockhill	0.44	1.53
SL-3.14	Hobby Airport	0.57	2.19
SL-3.15	Monroe Park & Ride	1.78	2.92
	Totals	11.59	31.76

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Table 2-18. Alternative SL-4 - AHCT Station-to-Station
Distances and Running Times
(Dwell times included)

Station Number	Station	Miles from Previous Station	Minutes from Previous Station
SL-4.01a and b	Bagby-Smith		
SL-4.02a and b	Main-Fannin	0.31	1.26
SL-4.03a and b	Crawford-Jackson	0.37	1.39
SL-4.04	Dowling-St. Charles	0.54	1.73
SL-4.05	McGowan-Dennis	1.49	3.61
SL-4.06	Sanders-Holman	0.44	1.52
SL-4.07	Cleburne-Wheeler	0.39	1.59
SL-4.08	West of University	0.66	2.18
SL-4.09	South of OST	1.01	2.60
SL-4.10	South of Dixie	2.31	3.12
SL-4.11	North of Belfort	0.74	1.55
SL-4.12	Hobby Airport	3.91	5.90
SL-4.13	Monroe Park & Ride	1.78	2.92
	Totals	13.95	29.39

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point on each short-listed alternative, then AHCT vehicle fleets, as light rail, would be as shown in Table 2-19. A corresponding assumption that BRT vehicles could provide adequate capacity by operating at four-minute headways during peak periods yields the BRT vehicle fleet requirements provided in Table 2-20.

Table 2-19. Light Rail Vehicle Fleet – Preliminary Estimate

	One-way running time (minutes)	Round trip time (min.) including layover and recovery	Vehicles to provide a six-minute headway	Allowance for spares and maintenance	Total Vehicle Fleet Required
SL-1 Downtown-Hobby-Monroe P&R	42	94	16	3	19
SL-2 Downtown-Hobby-Monroe P&R	35	80	14	3	17
SL-2 Southeast TC-TMC TC	10	25	5	0	5
Totals for Alternative SL-2	45	N/A	19	3	22
SL-3 Wheeler Station-Hobby-Monroe P&R	32	71	12	3	15
SL-4 Downtown-Hobby-Monroe P&R	29	66	11	3	14

Table 2-20. Bus Rapid Transit Vehicle Fleet – Preliminary Estimate

	One-way running time (minutes)	Round trip time (min.) including layover and recovery	Vehicles to provide a four-minute headway (six for TMC TC)	Allowance for spares and maintenance	Total Vehicle Fleet Required
SL-1 Downtown-Hobby-Monroe P&R	42	94	24	4	28
SL-2 Downtown-Hobby-Monroe P&R	35	80	20	3	23
SL-2 Southeast TC - TMC TC	10	25	5	0	5
Totals for Alternative SL-2	45	N/A	25	3	28
SL-3 Wheeler Station-Hobby-Monroe P&R	32	71	18	3	21
SL-4 Downtown-Hobby-Monroe P&R	29	66	17	3	20

3. ENVIRONMENTAL SCREENING OF DETAILED ALTERNATIVES

A comparison of the impacts of each proposed alignment provides the basis for this environmental screening which evaluates the physical, social, historical and environmental attributes of the study area. The assessment of potential impacts is independent of the type of technology (Bus Rapid Transit or Light Rail Transit) being considered. The following environmental categories provide a brief overview of the potential level of impact from the proposed alternatives. An evaluation matrix (Table 3-1) presents additional detail for each segment of a proposed alignment.

3.1 Urban Elements

3.1.1 Parkland and Recreational Areas

Segments of each alternative alignment are adjacent to a public park. These park areas include Emancipation Park on Dowling (SL-1), Peggy Miller and University Park on Scott Street (SL-2), and Jones Park on Griggs/Long (SL-2, SL-3). Potential impacts are primarily visual and noise related and would be rated as nine low impacts to these neighborhood parks.

3.1.2 Urban Forestry

On MLK Boulevard between Wheeler and Belfort, and Broadway between Belfort and Airport Road mature trees exist within the median. Alternatives SL-1 will require the permanent removal of these trees to accommodate project right-of-way; Alternative SL-3 has this effect on Broadway.

3.1.3 Community and Neighborhood Disruption

Community disruption may result when an alignment traverses a residential area or runs adjacent to public development (i.e., library, school) so that it limits access and/or mobility within a neighborhood and community. Alternative SL-3 may result in a community disruption impact since this alternative traverses the Greater Third Ward and multi-family development on Broadway and is adjacent to Peck Elementary and the Belfort Academy. The alignment for SL-1 also runs through the Greater Third Ward and multi-family development on Broadway. In addition, this alternative is adjacent to Alcott Elementary and the Belfort Academy. SL-2 traverses the MacGregor neighborhood while SL-4 traverses the Greater Third Ward, each of these potentially disrupt the surrounding neighborhood or community.

3.1.4 Land Use

The proposed alternatives are compatible with existing land uses and would provide a benefit to existing commercial/office, institutional, public, and industrial development. Proposed station locations for each alternative would encourage joint development with adjacent undeveloped land parcels. Some alternatives may realize greater benefits than others, due to better accessibility and mobility in relation to the proximity of land-use development. None of the alternatives produce negative impacts to any of the existing and/or proposed development in the study area.

Alternative SL-1 for the segment ending at MLK/Griggs proposes a station adjacent to undeveloped, commercial/office and residential land uses. Alternatives SL-2, SL-3, and SL-4

Table 3-1. Southeast Universities-Hobby Alternatives A23 Evaluation

Southeast-Universities-Hobby Alternatives A23 Evaluation	East of downtown, ending at Scott/Cleburne Street				From Scott/Cleburne ending at MLK/Griggs				Griggs/MLK to Telephone/Belfort			Griggs to Airport/Telephone
	SL-1	SL-2	SL-3 (From Wheeler Station)	SL-4	SL-1	SL-2	SL-3	SL-4	SL-1	SL-2	SL-3	SL-4
Acquisitions and Displacements.	None	None	None	None	Acquisition of Institutional property - Univ. of Houston	Relocation of SE Transit Ctr. Acquisition of 7 un-developed parcels & 7 undevel. Parcels for main/ storage facility	Acquisition of Institutional property - Univ. of Houston	Acquisition of Institutional property - Univ. of Houston	MLK/Belfort Acquisition of 15 commer. / Undeveloped parcels for Transit Ctr. & acquisition of undevel. Land for main/ storage facility	None	Acquisition of 7 undeveloped/ greenspace land parcels for main. / Storage facility	Acquisition undeveloped/ greenspace land parcel for main. / Storage facility
Air Quality/Conformity	The Environmental Protection Agency (EPA) has designated Harris County as a non-attainment area for ozone and monitors measured emission values that exceeded the primary NAAQS for ozone. The implementation of any one of the planned alternatives would improve the air quality of Harris County. This project would reduce the amount of vehicle miles traveled (VMT) as well as emission pollutants to improve air quality at intersections and other localized areas. Although these effects would occur at different locations for each alternative, no alternative would produce a substantially greater effect than another. A more distinguishing factor is the consideration of an alternative's vehicle technology. A Light Rail Transit (LRT) vehicle powered by electricity provides a greater benefit to air quality than a Bus Rapid Transit (BRT) system which is commonly powered by diesel fuel. However, a BRT system that operates compressed natural gas (CNG) vehicles would provide a similar benefit as LRT.											
Cumulative Impacts/Consistency with Local Plans (to be investigated in DEIS phase of study)												
Economic and Joint Development (see Chapter 5)												
Environmental Justice	6 Stations serve area w/residential minority population of approx. 75 %	3 Stations serve area w/residential minority population of approx. 80 %	4 Stations serve area w/residential minority population of approx. 90 %	3 Stations serve area w/residential minority population of approx. 80 %	2 stations serve an area w/residential minority population of approx. 98%	5 stations serve an area w/ minority population of approx. 83%	4 stations serve an area w/ minority population of approx. 86%	3 stations serve an area w/ minority population of approx. 90%	5 stations serve an area w/residential minority population of approx. 75%	2 stations serve an area w/residential minority population of approx. 75%	5 stations serve an area w/residential minority population of approx. 75%	3 stations serve an area w/residential minority population of approx. 75%
Farmlands	No impact	No impact	No impact	No impact	No impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Adjacent to City Prison farm, west of Mykawa Rd. -No Impact
Floodplains	No impact	No impact	No impact	No impact	Floodplain crossing along MLK Blvd. from Brays Bayou to midway of MacGregor Park approx. 1,200'	Floodplain crossing from N. MacGregor Way to S. MacGregor Way - approx.400'	Floodplain crossing along MLK Blvd. from Brays Bayou to midway of MacGregor Park approx. 1,200'	Floodplain crossing along Brays Bayou along BNSF RR - approx. 500'	Floodplain crossing on Belfort: fr Crestmont to BNSF RR- approx.3, 600' at Nunn- approx. 500';and from Hemingway to Telephone- approx.4,200'	Alignment is adjacent to floodplain at Telephone and Belfort Rd. - approx. 50'	Alignment is adjacent to floodplain at Long and Telephone Rd. - approx. 50'	Floodplain crossing on RR right-of-way adjacent to Law Park
Geotechnical (to be investigated in DEIS phase of study)												
Hazardous Materials (to be investigated in DEIS phase of study)												
Historical Properties and Archeological Resources	Potential Historic District on Dowling St. & along Cleburne St.	No Resources Identified	Potential Historic District along Cleburne St.	No Resources Identified	No Resources Identified	Riverside Terrace Neighbor-hood which includes Historic Resources	No Resources Identified	No Resources Identified	No Resources Identified	Potential Historic Resources -- Garden Villas	No Resources Identified	Potential Historic Resources -- Garden Villas

Southeast-Universities-Hobby Alternatives A23 Evaluation	East of downtown, ending at Scott/Cleburne Street				From Scott/Cleburne ending at MLK/Griggs				Griggs/MLK to Telephone/Belfort			Griggs to Airport/Telephone
	SL-1	SL-2	SL-3 (From Wheeler Station)	SL-4	SL-1	SL-2	SL-3	SL-4	SL-1	SL-2	SL-3	SL-4
Land use	Primarily Commercial, Industrial, & Public Institutional land uses are adjacent to planned stations	Primarily Public Institutional & Undeveloped land uses are adjacent to planned stations	Primarily Public Institutional (TSU), Undeveloped & single/multi-family residential land uses are adjacent to planned stations	Primarily Public Institutional & Undeveloped land uses are adjacent to planned stations	Primarily Commercial/Office, single family residential, & undeveloped land uses are adjacent to planned stations	Primarily Comm/Office, & public institutional (Univ. of Houston) land uses are adjacent to planned stations	Primarily public institutional (Univ. of Houston) & single family residential land uses are adjacent to planned stations	Primarily public institutional (Univ. of Houston) & office/commercial land uses are adjacent to planned stations	Primarily Office/Commercial, & single family residential land uses are adjacent to planned stations	Primarily Office/Commercial, & industrial land uses are adjacent to planned stations	Primarily Office/Commercial, & single family residential land uses are adjacent to planned stations	Undeveloped land uses are adjacent to planned stations
Natural Resources (to be investigated in DEIS phase of study)												
Navigable Waters & Coastal Zones	No impact	No impact	No impact	No impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Neighborhood/Community Disruption	Alignment traverses Southwestern Section of the 3rd Ward.	None	Alignment traverses Southwestern Section of the 3rd Ward.	None	Alignment is between Peck Elementary school with adjacent neighborhood	Alignment traverses Eastern part of MacGregor neighborhood	Alignment is between Peck Elementary school with adjacent neighborhood	Alignment traverses NE section of the Greater 3rd Ward neighborhood	Alcott Elementary school and Hartman Jr. High School is adjacent to the alignment	None	None	None
Noise (No. of potentially effected properties) and Vibration (No. of vibration sensitive resources) within 150 feet of alignment centerline	Noise: 242 Vibration: 242	Noise: 189 Vibration: 189	Noise: 236 Vibration: 236	Noise: 170 Vibration: 170	Noise: 44 Vibration: 44	Noise: 112 Vibration: 112	Noise: 48 Vibration: 48	Noise: 25 Vibration: 25	Noise: 306 Vibration: 306	Noise: 37 Vibration: 37	Noise: 62 Vibration: 62	Noise: 24 Vibration: 24
Parkland and Recreational Areas	Adjacent to Emancipation Park - Potential noise/visual impacts	Adjacent to Small Park - Peggy Miller; Univ. Park - Potential noise/visual Impact	No Impact	Adjacent to Small Park - Peggy Miller; Univ. Park - Potential noise/visual impacts	No Impact	Potential visual and noise impacts	Potential visual and noise impacts	No Impact	Adjacent to Jones Park Potential visual/noise impacts	Potential visual and noise impacts	Potential visual and noise impacts	No Impact
Political Boundaries (to be investigated in DEIS phase of study)												
Safety and Security (to be investigated in DEIS phase of study)												
Traffic (Including pedestrian and bicycle) (see Chapter 4 for preliminary traffic analysis)												
Urban Forestry	No Impact	No Impact	No Impact	No Impact	Removal of Vegetation w/in median - Low impact	Removal of Vegetation w/in median -- Low impact	No Impact	No Impact	Removal of mature trees w/in median -- Significant impact	Removal of mature trees w/in median -- Significant impact	Removal of mature trees w/in median -- Significant impact	No Impact
Visual and Aesthetics (to be investigated in DEIS phase of study)												
Water Quality	No water crossings	No water crossings	No water crossings	No water crossings	One Water Crossing -- Brays Bayou	One Water Crossing -- Brays Bayou	One Water Crossing -- Brays Bayou	One Water Crossing -- Brays Bayou	One Water Crossing -- Sims Bayou	One Water Crossing -- Sims Bayou	One Water Crossing -- Sims Bayou	One Water Crossing -- Sims Bayou
Wetlands	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact

Table 3-1. Southeast Universities-Hobby Alternatives A23 Evaluation (continued)

Southeast-Universities-Hobby Alternatives A23 Evaluation	Telephone/Belfort to Broadway/Airport			Airport/ Telephone to Broadway/ Airport	Broadway/Airport to Hinman/Airport				SE Transit Center to Texas Medical Center	Airport/ Telephone to Airport/ BNSF
	SL-1	SL-2	SL-3	SL-4	SL-1	SL-2	SL-3	SL-4	SL-2	SL-4
Acquisitions and Displacements.	None	None	None	None	Hinman Street Station Park & Ride; Storage/ Main. Facility - Undeveloped Land	Hinman Street Station -- Undeveloped Land	Hinman Street Station Park & Ride; Storage/ Main. Facility Undeveloped Land	Hinman Street Station -- Undeveloped Land	None	None
Air Quality/Conformity	The Environmental Protection Agency (EPA) has designated Harris County as a non-attainment area for ozone and monitors measured emission values that exceeded the primary NAAQS for ozone. The implementation of any one of the planned alternatives would improve the air quality of Harris County. This project would reduce the amount of vehicle miles traveled (VMT) as well as emission pollutants to improve air quality at intersections and other localized areas. Although these effects would occur at different locations for each alternative, no alternative would produce a substantially greater effect than another. A more distinguishing factor is the consideration of an alternative's vehicle technology. A Light Rail Transit (LRT) vehicle powered by electricity provides a greater benefit to air quality than a Bus Rapid Transit (BRT) system which is commonly powered by diesel fuel. However, a BRT system that operates compressed natural gas (CNG) vehicles would provide a similar benefit as LRT.									
Cumulative Impacts/Consistency with Local Plans (to be investigated in DEIS phase of study)										
Economic and Joint Development (see Chapter 5)										
Environmental Justice	4 stations serve an area w/resident minority pop. of approx. 60%	3 stations serve an area w/resident minority pop. of approx. 60%	3 stations serve an area w/resident minority pop. of approx. 60%	1 station serves an area w/resident minority pop. of approx. 60%	2 stations serve the neighboring area w/resident minority pop. of approx. 60%	3 stations serve the neighboring area w/resident minority pop. of approx. 60%	3 stations serve the neighboring area w/resident minority pop. of approx. 60%	2 stations serve the neighboring area w/resident minority pop. of approx. 60%	5 Stations serve area w/residential minority population of approx. 90 %	1 station serves the neighboring area w/resident minority pop. of approx. 60%
Farmlands	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Floodplains	Alignment crosses floodplain along Belfort from Telephone to Leonora - approx. 1,250'			No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Crosses floodplain on BNSF RR right-of-way from Hirondele to Evans Dr. -- approx. 3,500'
Geotechnical (to be investigated in DEIS phase of study)										
Hazardous Materials (to be investigated in DEIS phase of study)										
Historical Properties and Archeological Resources	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified	No Historic Resources Identified
Land use	Primarily office/ commer. & Multi-family residential land uses are adjacent to planned stations	Primarily office/ commer. , Multi-family residential & industrial land uses are adjacent to planned stations	Primarily office/ commer. , & Multi-family residential land uses are adjacent to planned stations	Primarily office/ commer. , Multi-family residential & industrial land uses are adjacent to planned the station	Primarily office/ commercial and undeveloped land uses are adjacent to planned stations	Primarily commercial, Industrial, and residential land uses are adjacent to planned stations	Primarily commercial, Industrial, and undeveloped land uses are adjacent to planned stations	Primarily commercial, Industrial, and residential land uses are adjacent to planned stations	Primarily Commercial, Office, Public/ institutional, and single-family residential	Undeveloped & Industrial land uses are adjacent to planned stations
Natural Resources (to be investigated in DEIS phase of study)										
Navigable Waters & Coastal Zones	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Neighborhood/Community Disruption	Alignment is adjacent to the Belfort Academy and traverses Multi-family development along Broadway	None	Traverses Multi-family development along Broadway	None	None	None	None	None	None	None

Southeast-Universities-Hobby Alternatives A23 Evaluation	Telephone/Belfort to Broadway/Airport			Airport/ Telephone to Broadway/ Airport	Broadway/Airport to Hinman/Airport				SE Transit Center to Texas Medical Center	Airport/ Telephone to Airport/ BNSF
	SL-1	SL-2	SL-3	SL-4	SL-1	SL-2	SL-3	SL-4	SL-2	SL-4
	Noise (No. of potentially effected properties) and Vibration (No. of vibration sensitive resources) within 150 feet of alignment centerline	Noise: 64 Vibration: 64	Noise: 1 Vibration: 1	Noise: 64 Vibration: 64	Noise: 130 Vibration: 130	Noise: 0 Vibration: 0	Noise: 0 Vibration: 0	Noise: 0 Vibration: 0	Noise: 0 Vibration: 0	Noise: 3 Vibration: 3
Parkland and Recreational Areas	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Political Boundaries (to be investigated in DEIS phase of study)										
Safety and Security (to be investigated in DEIS phase of study)										
Traffic (Including pedestrian and bicycle) (see Chapter 4 for preliminary traffic analysis)										
Urban Forestry	Removal of mature trees w/in median -- Significant impact	Removal of Vegetation w/in median -- Minimal impact	Removal of mature trees w/in median -- Significant impact	No Impact	Removal of Vegetation w/in median -- Low impact	Removal of Vegetation w/in median -- Low impact	Removal of Vegetation w/in median -- Low impact	Removal of Vegetation w/in median -- Low impact	No Impact	No Impact
Visual and Aesthetics (to be investigated in DEIS phase of study)										
Water Quality	No water crossings	No water crossings	No water crossings	No water crossings	No water crossings	No water crossings	No water crossings	No water crossings	One Water Crossing -- Brays Bayou	No water crossings
Wetlands	No Impact	No Impact	No Impact	No Impact	A palustrine emergent wetland (PEM1A) exists on the land parcel between Hinman and Monroe Road. The planned alignment for these segments would impact this wetland ecosystem.				No Impact	A palustrine emergent wetland (PEM1A) exists on land between Hinman and Monroe Rd.

Note: some categories have no data available since AA study is not that detailed.

planned for the segment ending at Scott/Cleburne provide an opportunity for joint development with adjacent undeveloped land. Alternative SL-4 also proposes a station adjacent to undeveloped land within the Broadway/Airport segment.

3.1.5 Acquisition and Displacements

Throughout the study area land parcels will be acquired for alignment right-of-way and the construction of station area locations. The segments that begin at Scott/Cleburne and end at Telephone/Bellfort require property acquisition that consists primarily of undeveloped parcels. However, Alternative SL-1 will need to purchase several land parcels that are intended for commercial-use, which may prove costly. None of the proposed alternatives would require displacement of any residence or business.

3.1.6 Navigable Waters

None of the planned alternatives cross a federally designated navigable waterway, thus there is no impact.

3.1.7 Noise and Vibration

A noise and vibration analysis conducted by Harris Miller Miller and Hanson, Inc., identified the number of potentially affected properties within 150 feet of an alternative alignment's centerline. In conducting the analysis for the Southeast Corridor Planning Study, the methods of the FTA's Transit Noise and Vibration Impact Assessment guidance manual screening procedures were applied to both the LRT and BRT options.

The noise screening procedure utilized the general screening distance found in the manual that was refined to include light rail and bus source reference levels, vehicle headways, and speeds. The LRT source level came from the specifications of the vehicle expected to be used in Houston. The bus noise source level was assumed to be that of a diesel articulated bus, as the data for a hybrid bus was not available. This assumption is representative of the existing technology and represents a worst-case scenario. Adjustments were made to the source levels to account for operations on the at-grade sections. All buildings were assumed to have unobstructed propagation conditions. The existing noise levels were estimated using the table of typical levels given in the FTA guidance manual (Table 5-7) and with a 5-decibel (dBA) factor of safety. FTA criteria for impact were used to develop a noise impact contour for each alternative. The noise contours were then superimposed onto a base map.

The vibration contours were developed using the distances given in the FTA guidance manual's screening procedure. No detailed data of the soil conditions or the road and guideway surfaces was available and therefore the distances were not refined to reflect that information. The vibration contours were then superimposed onto a base map.

Table 3-2 gives the distances used for the noise and vibration screening. These are the distances at which the contours have been drawn.

Table 3-2. Screening Distances (feet)

	Noise	Vibration
LRT		
At-Grade	55	150
BRT		
At-Grade	145	50

Land use Category 2 (residential) buildings that fell within the contours were counted and the resulting numbers of potential impacts are shown in Table 3-3 and Table 3-4. The corridor has been split into seven segments for alternatives 1, 2, and 3 with alternative 2 also including a segment for the Medical Center option to make the comparison of impacts associated with the LRT (Table 3-3) and BRT (Table 3-4) options and the type of structure (aerial, at-grade) more straightforward. Alternative 4 has been split into eight sections.

The impacted buildings include single- and multi-family residences in addition to park areas. If potential impact was shown at a park, it was counted as one receiver and is shown in both tables below.

Table 3-3. Potential Noise and Vibration Impacts for Category 2 Receivers - LRT

LRT Segment	1		2		3		4	
	Noise	Vibration	Noise	Vibration	Noise	Vibration	Noise	Vibration
Downtown to Dowling	0	0	0	0	--	--	4	8
Dowling to Wheeler/Scott	63	179, park	24	125	52	184	28	130
Wheeler/Scott to Griggs/MLK	2	42, park	24	88	2	46, park	--	--
Griggs/MLK to Bellfort/Telephone	48	258, park	4	33	16	46	--	--
Bellfort/Telephone to Hobby	16	48	0	1	15	49	--	--
Wheeler/Scott to Wheeler/MLK	--	--	--	--	--	--	0	25
Wheeler/MLK to BNSF/Griggs	--	--	--	--	--	--	0	0
BNSF/Griggs to BNSF/Bellfort	--	--	--	--	--	--	0	24
BNSF/Bellfort to Hobby	--	--	--	--	--	--	0	130
Hobby to Monroe	0	0	0	0	0	0	0	0
Monroe to Park and Ride	0	0	0	0	0	0	0	0
SE Transit to Medical Center	--	--	0	3, park	--	--	--	--
Total	129	531	52	251	85	327	32	317

Table 3-4. Potential Noise and Vibration Impacts for Category 2 Receivers - BRT

BRT Segment	1		2		3		4	
	Noise	Vibration	Noise	Vibration	Noise	Vibration	Noise	Vibration
Downtown to Dowling	0	0	0	0	--	--	8	4
Dowling to Wheeler/Scott	179, park	63	125	24	184	52	130	28
Wheeler/Scott to Griggs/MLK	42, park	2	88	24	46, park	2	--	--
Griggs/MLK to Bellfort/Telephone	258, park	48	33	4	46	16	--	--
Bellfort/Telephone to Hobby	48	16	1	0	49	15	--	--
Wheeler/Scott to Wheeler/MLK	--	--	--	--	--	--	25	0
Wheeler/MLK to BNSF/Griggs	--	--	--	--	--	--	0	0
BNSF/Griggs to BNSF/Bellfort	--	--	--	--	--	--	24	0
BNSF/Bellfort to Hobby	--	--	--	--	--	--	130	0
Hobby to Monroe	0	0	0	0	0	0	0	0
Monroe to Park and Ride	0	0	0	0	0	0	0	0
SE Transit to Medical Center	--	--	3, park	0	--	--	--	--
Total	531	129	251	52	327	85	317	32

As shown in above two tables, because the LRT noise-screening distance is virtually the same as the BRT vibration-screening distance and the LRT vibration-screening distance is virtually the same as the BRT noise-screening distance, the identified noise and vibration impacts of LRT and BRT are identical, except reversed.

3.2 Natural Elements

3.2.1 Air Quality

Harris County is designated as a non-attainment area for ozone and monitors measured emission values that exceeded the primary National Ambient Air Quality Standards (NAAQS) for ozone. The implementation of any one of the planned alternatives would improve the air quality of Harris County. This project would reduce the amount of vehicle miles traveled (VMT) as well as emission pollutants to improve air quality at intersections and other localized areas. Although these effects would occur at different locations for each alternative, no alternative would produce a substantially greater effect than another. A more distinguishing factor is the consideration of an alternative's vehicle technology. A LRT vehicle powered by electricity provides a greater benefit to air quality than a BRT system that is commonly powered by diesel fuel. However, a BRT system that operates compressed natural gas (CNG) vehicles would provide a higher benefit than the diesel-powered buses.

3.2.2 Water Quality

Each alternative crosses Brays Bayou and Sims Bayou within the existing transportation right-of-way between the alignment segments from Scott/Cleburne Street ending at Telephone/Belfort.

3.2.3 Wetlands

A palustrine emergent wetland (PEM14) exists on a land parcel between Hinman and Monroe Road. Each alternative alignment traverses this parcel and proposes to locate the Hinman Street Station in the Broadway/Airport – Hinman/Airport segment. The proposed station area is adjacent to the identified wetland.

3.2.4 Farmlands

Current land development within the study area prohibits an adequate amount of available land for significant agricultural purposes. However, there is a land area designated as farmland west of Hobby Airport. Planned alternatives SL-1, SL-2, and SL-3 would have no impact on farmlands since each alignment is situated within an urban environment. Alternative SL-4 runs adjacent to the City prison farm (west of Mykawa Road). The alignment is within existing transportation right-of-way and would not result in the loss of any designated farmland. Any impact that may occur would be short-term and associated with construction activities.

3.3 Cultural Resources

Based upon field reconnaissance and historic research conducted by Myra L. Frank and Associates, potential historic resources are concentrated almost exclusively north of Griggs Road and Old Spanish Trail, largely within the boundaries of the old Third Ward. Virtually no potential historic resources were identified, other than the Garden Villas Subdivision, which is south of Old Spanish Trail and Griggs Road. Each proposed alignment either traverses or is adjacent to a potential historic resource as identified.

No formal determination of effects per the Criteria of Effect (the measures specified for assessing impacts for federally-assisted projects) has been made at this point in project planning. It is important, however, to identify situations that which could cause an “adverse effect” on historic resources, so that planning and design considerations to avoid such situations can take place as alternatives and alignments are developed over time. An “adverse effect” could arise from alteration of the resource or its immediate surroundings such that the physical characteristics that justify the classification as an historic resource might be materially impaired. The progress of design work will be periodically reviewed to monitor whether such situations are developing and ways that adjustments can be made to avoid or lessen potential adverse effects.

By way of summary, the following overall observations are offered, grouped by neighborhood, followed by a list of addresses of specific properties located outside groupings of historic resources of concern.

Rusk-Capitol Streets Corridor

Alternative Alignments SL-1, SL-2 and SL-4 originate on Rusk and Capitol Streets in the Downtown area. The streets within Downtown’s Rusk-Capitol corridors segment contain a number of architecturally and historically significant high-rise buildings eligible for local landmark recognition, and several that are potentially individually eligible for the National Register. While these are not part of an identified historic district the demolition of buildings would result in a potential effect. Significant changes to the design setting of the historic buildings might also pose a potential effect.

A list of all previously identified architectural/historic resources located Downtown, and in the Third Ward and Riverside/Timbercrest neighborhoods was developed and is available upon request. The list was compiled from the *Houston Architecture Guide* (1990), Houston Architectural Survey (1980), and the 2002 City of Houston Department of Planning & Development listings of landmarks/potential landmarks.

Chinatown District

Alternative Alignments SL-1, SL-2 and SL-4 traverse the Chinatown neighborhood. Although most of the Chinatown district that once existed along N. Chartres and St. Emanuel Streets to the east of the Enron Stadium and the Convention Center has been demolished over the years, at least one of the small number of surviving buildings is documented in the Houston Architectural Guide: The On Leong Chinese Merchants Association building, at 801-811 Chartres Street (1951). The building bears a compelling association with Houston’s Chinese community. Research will need to be done to identify whether any other buildings survive in the vicinity that are also strongly associated with the Chinese and that are potentially landmark-eligible. It will also need to be confirmed whether there are additional resultant historical archaeological concerns in doing rail construction-related excavation work in this locale.

Dowling Street Corridor

Dowling Street embodies the history of the African-American community in Houston’s Third Ward, notwithstanding the advanced state of deterioration of the building stock and the loss of numerous older buildings over the years. Randy Pace of the City of Houston Planning and Development Department and Kent Hadnot of the Third Ward Economic Redevelopment Council confirm the existence of a potential shotgun house/row house district bounded roughly by U.S. Highway 59 (west) and Burkett Street (east), Tuam and Alabama Streets (south). Dowling Street traverses this district and thus the SL-1 Alternative poses a potential effect to it — particularly given the narrow street rights-of-way. The contributing resources within the district and the district’s character-defining features will need to be identified and

documented. Note that it is our understanding that no detailed building-by-building historic resources survey of this neighborhood has ever been conducted.

Demolition of contributing resources, removal of mature trees, and other changes to the district's character-defining features (e.g., white and blue tile street markers on curbs) should be avoided.

Washington Terrace District

A second potential historic district exists west of Texas Southern University. Known in the community as Washington Terrace, this is a residential neighborhood consisting of brick cottages and two-story residences (dates of construction: circa 1920-1930), bounded loosely by Alabama Street (north), Southmore (south), and Ennis Street (east). Although there are a number of vacant lots and some incompatible newer infill development, this grouping of buildings is visually unified in terms of construction, color, a shared range of architectural details, and local African-American social history. The SL-1 and SL-3 Alternatives traverse this potential historic district along Cleburne Street along fairly narrow street rights-of-way and thus potentially pose an effect to this as yet undocumented potential district.

Riverside/Timbercrest Neighborhoods

These neighborhoods contain a number of architecturally significant resources (per the *Houston Architectural Guide*; 1990 and the "Houston Architectural Survey"; 1980). SL-2 traverses Riverside Terrace neighborhood within a block or so of significant resources and also traverses the extension of MacGregor Park along Brays Bayou. The Scott Road segment of SL-2 has some potential to affect the setting of historic resources.

Garden Villas Subdivision/Airport Road

Garden Villas is a residential subdivision bounded loosely by the FW&D – CRI&P Railroad right-of-way (west), Sims Bayou (north), Airport (south), and Telephone Road (east). It is significant from the standpoint of urban planning and architectural design.

SL-2, SL-3 and SL-4 all touch the outer edges of Garden Villas but do not actually traverse any of the developed portions of the subdivision. The outside edges of the tract seem divorced visually from the residential streets inside and do not convey the design character of the interior portion of the tract. Therefore effects to potential historic resources at this location are unlikely provided that the current alignments remain on the streets bordering the edge of the neighborhood.

No resources of concern were noted nearby along Mykawa Road/railroad right-of-way, Telephone Road or Airport Boulevard.

A small number of scattered properties along Griggs Long Road, Old Spanish Trail appear to be historically and/or architecturally significant:

- St. Peter the Apostle Catholic School (at the NWC of LaSalette an Old Spanish Trail) Circa 1950—Possibly the work of the accomplished Houston architect Stayton Nunn. Research will be done to ascertain the name of the architect and to assess the school's design significance.
- 4113 Griggs Road (just above Old Spanish Trail)— Old turn-of-the century farmhouse and auxiliary buildings. This is a noteworthy resource due to its age, design and possible historical associations. Research will be done to assess its historical significance.

- 4013 Griggs Road (just above Old Spanish Trail)—Old Craftsman style bungalow farmstead. This is a noteworthy resource due to its age, design and possible historical associations. Research will be done to assess its historical associations.
- 5151 Martin Luther King, Jr. Boulevard. The Ingrando House (circa 1930) is a two-story, mansion-scaled Federal Revival style residence that is noteworthy in its neighborhood setting for the quality of its architectural design and for its scale. The building appears eligible for local landmark status. The building was previously identified in an architectural survey as being eligible for local landmark consideration (1984; Roger Hatheway & Associates).
- 5350 Martin Luther King, Jr. Boulevard. This mansion-scaled two-story, Georgian Revival style residence that is noteworthy in its neighborhood setting for the quality of its architectural design and for its scale. The building was previously identified in an architectural survey as being eligible for local landmark consideration (1984; Roger Hatheway & Associates).
- 5312 Martin Luther King, Jr. Boulevard. Pan American Church (circa 1950) is the quintessential Southern red brick version of the American Colonial Revival village church. It was previously identified in an architectural survey as being eligible for local landmark consideration (1984; Roger Hatheway & Associates).

In summary, alternatives SL-1 and SL-3 of the segment ending at the Scott/Cleburne intersection both traverse areas of the Greater Third Ward where historic resources potentially exist. The Scott Road section of Alternative SL-2 runs through the Riverside/Timbercrest neighborhoods, where a number of architecturally significant resources exist. In addition, the alignment for alternatives SL-2 and SL-4 (Griggs/MLK to Telephone/Bellfort segment) are each adjacent to the outer edge of the Garden Villas subdivision but do not traverse any developed portions.

3.4 Construction Impacts

A similar level of construction impact is likely to occur for each alternative alignment that operates within the roadway median. The level of construction impact will be greater along sections of an alternative's alignment that is bordered by commercial/office and/or residential development. These areas would experience potential impacts such as noise, vibration, air quality, traffic, visual, and utility service disruptions from construction activities.

Alternative SL-4 would have the least amount of impact since a segment of the alignment is planned to operate within the existing Burlington Northern Sante Fe Railroad Corridor. SL-2 would likely result in the greatest level of construction impact since the planned alignment is longer than any other alternative. Alternatives SL-1 and SL-3, have a similar level of construction impact with SL-3 having the least amount of impact because of its shorter length.

3.5 Cumulative Impacts

The proposed alternative alignments will primarily operate within the existing transportation right-of-way. As a result, the majority of project impacts for each alternative would be short-term and primarily attributed to construction activity. Potential long-term impacts may result from any land acquisition for station development and the installation of an exclusive guideway. These impacts may include but are not limited to visual and aesthetic, noise and vibration, traffic, and community disruption.

3.6 Environmental Justice Issues

Each of the proposed alternatives traverses areas with low-income minority populations. The proposed alignment and station locations for each alternative are adjacent to land use areas that primarily include residential, commercial/office, industrial, and institutional development. This project will result in service improvements for community residents and provide a direct connection to activity centers throughout Metropolitan Houston. In addition, improved mobility will provide residents with greater access to regional jobs and non-job opportunities (such as shopping, entertainment, recreation activities).

No environmental justice issues are anticipated as a result of the direct benefit provided to local communities through the implementation of an improved transit service.

4. TRANSPORTATION IMPACTS

4.1 Transit Impacts

4.1.1 Demand Potential Methodology and Results

The METRO Service Estimator is a sketch planning tool employed in the initial (Phase 1/Phase 2) evaluation to determine the demand potential for new or modified transit service. While detailed modeling is not required at this level of screening, the Service Estimator provides an order-of-magnitude comparison or index of demand potential of any given alignment relative to other potential alignments within the same corridor. The index is calculated by determining the following characteristics for each alignment:

- Total employment within any travel zone that touches a one-tenth mile buffer around the AHCT alignment;
- The AM peak service frequency;
- Span of service;
- The number of low-income households within any travel zone that touches a one-tenth mile buffer around the AHCT alignment; and
- The number of mid to high-income households within a 5-mile buffer of stations with parking.

In addition, population is extracted for a one-tenth mile buffer, population and employment for a one-quarter mile buffer (the threshold distance for accessing AHCT), and population and employment for a one-half mile buffer (for high density areas with pedestrian friendly environments). Population is also extracted for a five-mile buffer surrounding AHCT stations with parking. The five-mile buffer represents a catchment area for transit riders who drive to facilities that provide parking. Each characteristic contributes to the demand potential calculation based on a unique coefficient derived during the model calibration process. The contribution of each characteristic is totaled and the resulting number is divided by 1000 to produce the demand potential index for a given corridor alignment. Subsequently, the demand potential indices for all alignments for a given corridor are scaled in comparison to the alignment with the highest calculated potential, which is scaled at 100.

In Phase 3 of the evaluation process, when the System Plan scenarios are tested, METRO's Long-Range Patronage Forecasting Model will be employed. This EMME/2-based model allows for analysis of linked trips in a network of AHCT alternatives, providing forecasted ridership for various combinations of AHCT alignments and technologies operating within the regional network. The model provides data for:

- Systemwide linked trips;
- Systemwide boardings;
- Systemwide capital costs;
- Systemwide operating costs; and
- BRT, LRT and total AHCT boardings.

More detailed information regarding travel demand methodology is presented in the METRO Mobility Travel Demand Estimation Methods Working Paper dated December 2002.

The analyses indicate that Alternatives SL-1 and SL-2 would be close to equal in demand potential and related mobility benefits, with SL-2 having a slight advantage. The other two alternatives, SL-3 and SL-4 would also be close to one another in demand potential, but at a lower level compared with SL-1 and SL-2. If SL-1 and SL-2 are scored as 100, SL-3 and SL-4 achieve a score of 90 and 75 respectively. Alternative SL-3 has a lower score because it does not provide service directly to Downtown, which is the largest single destination outside the corridor for trips originating within the corridor. Alternative SL-4 has a lower score because it does not serve as much population and employment within the corridor as do the other alternatives.

Data indicating demand potential were also compiled for individual sectors within the corridor, to allow evaluation of alternative route segments that have common points of intersection within the corridor and thus could be selected interchangeably.

4.1.2 Roadway Impacts

In general there is a modest favorable effect on traffic within the corridor due to diversion of some trips from private vehicles to public transportation. A further small favorable effect will result from a reduction in the frequency of bus service along the AHCT corridors, due to diversion of transit passengers from bus to AHCT and corresponding service adjustments.

There will be measurable adverse effects on traffic along some of the arterial streets used as AHCT rights of way. These effects will be caused by reduction of the number of traffic lanes in some locations, by elimination of left turns or other crossing traffic movements in some locations, and possibly by the results of giving traffic signal priority to AHCT vehicles. The coordination of traffic signals into a "greenwave" to expedite the movement of AHCT vehicles utilizing the signal prioritization technology can also have a positive effect on traffic moving in the same direction as the AHCT vehicles. Upgrading the traffic signals can also provide increased reliability and added flexibility.

4.1.2.1 Traffic Analysis

Traffic analysis was conducted for selected intersections for two conditions: No Build and AHCT. Since the AHCT corridor is still in the planning stage, four alternative AHCT corridors were investigated. The intersection analysis will be used to determine if the roadway operations will be negatively affected by the future AHCT line. The alternatives were analyzed for the years 2007 and 2022 for the P.M. peak hour, which represents the worst case. Six critical intersections, some of which are located on several route alternatives, were identified, as follows:

1. Belfort at Telephone
2. Elgin at Dowling
3. Griggs at MLK
4. Belfort at MLK
5. Scott at Wheeler
6. Belfort at Mykawa

Existing turning movement counts collected in December 2002 were used as a base for each critical intersection. The existing volumes were sub-divided into passenger cars, trucks,

buses, and school buses. For the analysis, truck, bus, and school bus volumes were combined as heavy vehicles. Existing traffic volumes can be found under Appendix E.

The configuration of each intersection is described below:

Belfort at Telephone: This intersection is signalized with Belfort extending east-west and Telephone extending north-south. There are two lanes in each direction on Belfort with left turn bays for both eastbound and westbound traffic and a right turn bay for eastbound traffic. There are three lanes in each direction on Telephone with left turn bays for northbound and southbound traffic. The speed limit on both Telephone and Belfort is 35 mph.

Elgin at Dowling: This is a four-legged signalized intersection of the east-west roadway, Elgin, and the north-south roadway, Dowling. Elgin has two lanes in each direction with left turn bays for both eastbound and westbound traffic. Dowling also has two lanes in each direction but does not provide turn bays for turning vehicles. The speed limit is 35 mph on both Elgin and Dowling.

Griggs at MLK: This intersection connects an east-west street, Griggs, with a north-south street, MLK. Griggs has two lanes in each direction with left turn bays for eastbound and westbound traffic. MLK has three lanes in each direction with left turn bays for northbound and southbound traffic. The speed limit is 35 mph on both Griggs and MLK.

Belfort at MLK: This intersection is signalized with Belfort extending east-west and MLK extending north-south. There are two lanes in each direction on Belfort with left turn bays for eastbound and westbound traffic. There are three lanes in each direction on MLK with left turn bays for northbound and southbound traffic. The speed limit is 35 mph on both Belfort and MLK.

Scott at Wheeler: This signalized intersection connects Wheeler, an east-west street, with Scott, a north-south street. Wheeler has one through lane in each direction with parking adjacent to the through lane. Westbound traffic on Wheeler also has a right turn bay. Scott has two lanes in each direction with left turn bays for both northbound and southbound traffic. The speed limit is 35 mph on Scott and is 30 mph on Wheeler.

Belfort at Mykawa: This intersection connects an east-west roadway, Belfort, with a north-south roadway, Mykawa. Belfort has two lanes in each direction with left turns being shared in the through lane. Mykawa also has two lanes in each direction with shared left turns. The speed limit is 35 mph on both Belfort and Mykawa.

4.1.2.1.3 Traffic Forecasts

Traffic forecasts from the Houston-Galveston Area Council (H-GAC) were used to determine growth rates for the study area. The H-GAC data showed a one to two percent annual growth rate for some intersections while some specific intersection approaches actually had negative growth rates between 2003 and 2022. Therefore, to remain conservative and consistent with standard acceptable growth rates in the City of Houston, a one percent annual growth rate was applied to the 2002 data to develop 2007 and 2022 volumes.

4.1.2.1.4 Alternatives

No Build

The No Build alternative considered existing lane conditions at each intersection and projected traffic volumes for 2007 and 2022. No additional roadway improvements were considered in this alternative.

AHCT

The AHCT option included four alternative routes. For this study, each route was considered to determine the possible impacts of AHCT. In all of the AHCT alternatives, traffic volumes were not modified to account for drivers choosing alternate routes away from the rail line. While this assumption is conservative, it will determine the worst case scenario for impact on the critical intersections. It was also assumed that the heavy vehicle percentage would remain the same, although it is expected that the introduction of AHCT will result in a reduction in the number of buses along the AHCT route. Each of the four AHCT alternatives is described below.

SL-1

This alternative will start in downtown Houston and proceed east through downtown to Dowling. It will continue south on Dowling to Cleburne and then east on Cleburne to Scott. AHCT continues from the Scott/Wheeler intersection to the Griggs/MLK intersection via Wheeler and MLK. It then turns to the east and extends along Bellfort to Broadway, then on Broadway to Hobby Airport.

For this alternative, the following intersection modifications will be made:

- Bellfort at Telephone: Eastbound and westbound left turn bays on Bellfort will be eliminated. Left turn movements will be shared in the through lane.
- Elgin at Dowling: Northbound and southbound Dowling will be reduced to one lane in each direction. All movements will be shared by the single lanes.
- Griggs at MLK: Northbound and southbound left turn bays will be eliminated on MLK. Left turn movements will be shared in the through lane.
- Bellfort at MLK: There are no changes for this alternative.
- Scott at Wheeler: There are no changes for this alternative.
- Bellfort at Mykawa: There are no changes for this alternative.

SL-2

This alternative starts in downtown Houston and heads east to Scott. It continues south on Scott to Griggs and then east on Griggs and Long Drive to Telephone. The rail continues south on Telephone to eastbound Airport to reach Hobby Airport.

For this alternative, the following intersection modifications will be made:

- Bellfort at Telephone: Northbound and southbound left turn bays on Telephone will be eliminated. Left turn movements will be shared with the through movements.
- Elgin at Dowling: Not affected by this alternative.
- Griggs at MLK: Eastbound and westbound left turn bays will be eliminated on Griggs. Left turn movements will be shared in the through lane.
- Bellfort at MLK: Not affected by this alternative.
- Scott at Wheeler: Northbound and southbound Scott will be reduced to one lane in each direction. All movements will be shared by the single lanes.

- Belfort at Mykawa: Not affected by this alternative.

SL-3

This alternative starts in midtown Houston and travels east on Cleburne and Wheeler to MLK. It continues south on MLK to Griggs and then east on Griggs and Long to Telephone. It then turns to the east and extends along Belfort to Broadway, then Broadway to Hobby Airport.

For this alternative, the following intersection modifications will be made:

- Belfort at Telephone: Northbound and southbound left turn bays on Telephone will be eliminated. The westbound left turn bay on Belfort will also be eliminated.
- Elgin at Dowling: Not affected by this alternative.
- Griggs at MLK: Northbound and southbound left turn bays on MLK are eliminated. Eastbound and westbound left turn bays on Griggs are eliminated.
- Belfort at MLK: Not affected by this alternative.
- Scott at Wheeler: There are no changes for this alternative.
- Belfort at Mykawa: Not affected by this alternative.

SL-4

This alternative starts in downtown Houston and extends east to Scott. It continues south on Scott to Wheeler. It turns east on Wheeler to the Burlington Northern Santa Fe Railroad alignment, which it then follows to Airport Road, then following Airport Road to Hobby Airport.

For this alternative, the following intersection modifications will be made:

- Belfort at Telephone: There are no changes for this alternative.
- Elgin at Dowling: There are no changes for this alternative.
- Griggs at MLK: There are no changes for this alternative.
- Belfort at MLK: There are no changes for this alternative.
- Scott at Wheeler: There are no changes for this alternative.
- Belfort at Mykawa: There are no changes for this alternative.

For the analysis, it was assumed that when the AHCT vehicle crosses an intersection, it will have a separate signal phase, due to the shared vehicle turning movements at the intersections. For this reason, a 10 second all-red phase was modeled to account for the AHCT phase. This represents the worst-case scenario due to the all-red phase happening in every cycle in the model, when in reality the AHCT vehicle normally would be present only every other cycle or less often, having a normal peak-period headway of six minutes in each direction.

4.1.2.1.5 Methodology

Based on the previously described assumptions, turning movement counts were developed for 2007 and 2022. Traffic simulation software was used to determine the average delay and

level-of-service (LOS) for each of the six intersections. The traffic software, Synchro, based on methods outlined in the Highway Capacity Manual, was used for the analysis. A separate simulation was performed for each intersection. Analysis output files can be found under Appendix F for 2007 and 2022, respectively.

4.1.2.1.5 Findings

After comparing the analysis, each intersection was assigned a level-of-service based on the average delay for the intersection. A summary of the average delay and LOS for each intersection analyzed can be found in Table 4-1 and Table 4-2 for 2007 and 2022 respectively. When comparing the No Build option with four AHCT options, there are several intersections that experience a reduction in level of service.

Table 4-1. P. M. Peak Hour Average Delay/Level-of-Service Summary - Year 2007

Intersection	No Build		Light Rail: SL-1		Light Rail: SL-2		Light Rail: SL-3		Light Rail: SL-4	
	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
Bellfort /Telephone	28.7	C	74.5	E	26.1	C	30.7	C	-	-
Elgin/Dowling	20.1	C	20.6	C	-	-	-	-	-	-
Griggs/MLK	24.8	C	66.0	E	23.4	C	19.3	B	-	-
Bellfort /MLK	26.3	C	-	-	-	-	-	-	-	-
Scott/ Wheeler	15.1	B	-	-	82.1	F	-	-	-	-
Bellfort/ Mykawa	17.0	B	-	-	-	-	-	-	-	-

Table 4-2. P. M. Peak Hour Average Delay/Level-of-Service Summary - Year 2022

Intersection	No Build		Light Rail: SL-1		Light Rail: SL-2		Light Rail: SL-3		Light Rail: SL-4	
	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)	LOS
Bellfort /Telephone	45.1	D	86.9	F	42.1	D	53.4	D	-	-
Elgin/Dowling	20.7	C	23.9	C	-	-	-	-	-	-
Griggs /MLK	27.5	C	80.9	F	33.5	C	53.8	D	-	-
Bellfort /MLK	26.3	C	-	-	-	-	-	-	-	-
Scott /Wheeler	17.6	B	-	-	133.3	F	-	-	-	-
Bellfort /Mykawa	17.0	B	-	-	-	-	-	-	-	-

Projects advancing into preliminary engineering and final design will be the subject of detailed study and design development to minimize adverse traffic effects while assuring the highest possible levels of safety and of AHCT service predictability.

5. ECONOMIC DEVELOPMENT POTENTIAL

A total of 31 potential station sites along a number of potential alignments were reviewed during two field trips. Based on previous transit related development studies, information obtained at the Fall 2001 Transit Oriented Development Conference sponsored by TSU, and numerous interviews with commercial brokers and multi-family, retail and office developers over the past three years, the development attractiveness around each potential station location was assessed. Following the commonly accepted principle that transit related development normally occurs within a one-fourth-mile radius of any given station site, the following factors were considered in evaluating attractiveness for nearby development:

1. Availability of vacant properties, including those with long closed retail or other buildings. A positive factor.
2. Availability of old, outdated, blighted re-developable improved properties that are substantially underutilized in terms of future potential. A positive factor.
3. Existence of modern and attractive retail, service and community facilities or parks nearby that render the areas around potential transit stations attractive to new residents or tenants, and therefore suitable for development or redevelopment. A positive factor.
4. Existence of single-family or high-occupancy multi-family housing, regardless of age, that may preclude redevelopment under the often-used label "gentrification" which is objected to by many neighborhood groups. A limiting factor.
5. Existence of older industrial, office or retail facilities that nevertheless employ ten or more workers or staff and are in acceptable, well-maintained condition. A limiting factor due to potential job displacement, which is objected to by neighborhood and some business groups.
6. Natural or man-made barriers, extremely unattractive surrounding land use, or other features that render the one-fourth-mile area less than desirable for residential or retail development. A limiting factor.
7. Existence of institutional facilities or properties that are not available for private development. A limiting factor.
8. The relatively low HGAC projection of 6,990 added households (2025 vs. 2000) in the entire study area, of which only a fraction can be expected to occur within ¼-mile radii of potential transit stations. A limiting factor.

Utilizing these factors, a qualitative assessment was developed for each of the 31 sites. These sites are listed in Table 5-1 together with the principal reasons why each is regarded as a poor, fair, good or excellent candidate for private development. Of the 31 sites, only 11 are believed to rank excellent, good or fair in terms of attractiveness for future development.

Based on this analysis, the amount of property available for future development or redevelopment for each station submarket considered fair, good or excellent was quantified, and the most attractive land use for each parcel or tract was identified. Quantification of available properties was accomplished through detailed examinations of property maps for the submarkets concerned on file at HCAD. The most attractive land use for each parcel or tract was then confirmed by means of a second field tour of all station sites considered fair, good or excellent for possible private development over the 2001-2025 planning period. (Since completion of actual transit improvements is not believed likely until 2010 or later, a substantial share of new development can be expected to occur after that date.)

Table 5-1. Relative Attractiveness of Thirty-One Potential Station Locations for Private Development/Redevelopment Southeast/Universities/Hobby Corridor Study Area

No.	Potential Station Location	Private Development Grade	Comments
1.	Dowling & Polk	Poor	Industrial area for foreseeable future.
2.	Scott & Polk	Poor	Industrial area. Little or no industrial development likely associated with AHCT improvements.
3.	HB&T & Leeland	Poor	Industrial and truck storage area. Oak Farms Dairy nearby.
4.	Velasco (HB&T) & McGowan	Poor	Long established Third Ward single-family homes neighborhood.
5.	Velasco (HB&T) & Elgin	Poor	Long established Third Ward single-family homes neighborhood.
6.	Dowling & Elgin	Fair	Several tracts/properties available for development/redevelopment. Several community facilities nearby including Emancipation Park, Ray Martin Boxing and Community Center, James Ryan Middle School and Baptist Church. Bus Route 80.
7.	Dowling & Wheeler/Blodgett	Poor	Long established middle-income single-family home neighborhood.
8.	Scott & Elgin	Poor	On east edge of Third Ward. Commercial intersection with UH baseball stadium on southeast corner, but little property available.
9.	Velasco (HB&T) & Cleburne	Poor	Long established middle-income single-family home neighborhood.
10.	Cleburne & Tierwester	Poor	TSU facilities and properties.
11.	Cleburne & Scott	Poor	TSU/UH facilities and properties.
12.	Blodgett & Burkett	Poor	TSU facilities and properties. Single-family homes.
13.	Blodgett & Scott	Poor	Established single-family home neighborhoods. UH facilities and properties.
14.	Cullen & Wheeler	Poor	UH facilities and properties.
15.	Scott & OST	Good	Good retail facilities, including HEB store and neighborhood shopping center, and Texas Dept. of Human Services in southwest quadrant. Peter Academy one block west on La Salette. Solid middle/ upper-middle income single-family subdivision (Riverside Terrace) north of Griggs. Middle-income neighborhood to south. Vacant and redevelopable properties available. Bus Routes 5, 26, 27, 52, 60 and 87.
16.	Scott & Corder	Fair	Logical station site along a Scott Street alignment, halfway between OST and Belfort. Older single-family neighborhoods nearby. New multi-family project two blocks south under construction. Large tract available southwest corner. Traffic light at intersection but no community destinations. Bus Route 52.
17.	Scott & Belfort	Poor	Surrounded by single-family home subdivisions. Sunnyside Park two blocks west.
18.	Belfort & Cullen	Good	Attractive intersection with existing multi-family housing nearby. Large tract available in southeast quadrant. Bus routes 30, 73 and 87.

No.	Potential Station Location	Private Development Grade	Comments
19.	MLK & Griggs	Good	Excellent transit stop location with land available for development and redevelopable properties as well. There are a number of community institutional locations on what was once the site of the Palm Center Mall, including Alice Young Branch Library, Kelsey-Seybold Clinic, Shell Youth Training Academy, Houston Community College, Houston Read Commission, Houston Urban League Business Systems Training Center, Houston Business & Technical Center and Harris County Tax Assessors office. Bus routes 5 and 77.
20.	MLK & 610	Good	Significant single-family development south of 610 consisting of Southpark, Southcrest and Inwood Terrace subdivisions with fast food commercial at MLK and 610 interchange. Wellness Center on northeast corner of MKL and Beekman to north. McGregor Terrace single-family subdivision northwest of MLK and Yellowstone in northwest quadrant. Large vacant tract between 610 and RR track on northeast corner of 610 and MLK suitable for retail or multi-family. Bus routes 77 and 87.
21.	MLK & Bellfort	Poor	Intersection surrounded by single-family development.
22.	Mykawa & Griggs/Long Drive	Poor	Unattractive location for any type of residential development due to heavy rail freight line parallel to Mykawa and large construction materials site at northwest corner. Large Fiesta market behind EZ Pawn shop on southwest corner. Vacant properties east of BNSF tracks in northeast and southeast quadrants.
23.	Mykawa & Dixie	Good	Unattractive station site due to elevation of heavy rail freight line. However, substantial tracts available north and south of Dixie east of tracks suitable for single-family development.
24.	Mykawa & Bellfort	Poor	Surrounded by single-family development with City Prison Farm to the south.
25.	Mykawa & Airport	Poor	Single-family in northeast quadrant. Industrial in other three quadrants.
26.	Wheeler & OST/So. Wayside	Good	Attractive intersection at So. Wayside with Gragg Park in southeast quadrant and wooded tract on southwest corner bisected by small bayou that is tributary to Brays Bayou. Another property side of OST intersection. Suited to multi-family development with limited convenience retail. Excellent access to UH, if east-west bridge constructed over Brays Bayou with underpass under HB&T tracks, and to Gulfgate to the east. Bus routes 26 and 27.
27.	Telephone Rd. & Plum Creek	Excellent	Excellent multi-family, professional office and convenience retail development potential west of Gulfgate Shopping Center very near Concord at Gulfgate apartment now under construction. Combined new retail space open, under construction or planned totals 907,000 SF. Concord and recently completed Plum Creek apartment projects total 440 units. Substantial underutilized and some vacant properties available. Principal activity center in Southeast Houston for foreseeable future.
28.	Telephone Rd. & Park Place/ Long Drive	Fair	Houston Department of Health and Human Services is a somewhat important community destination on northeast corner. Large vacant tract east of this complex suitable for multi-family development. Otherwise, an unattractive site for development as Long Drive to the west is predominantly industrial. Bus routes 5 and 40.

No.	Potential Station Location	Private Development Grade	Comments
29.	Telephone Rd. & Bellfort	Good	Active intersection with fairly substantial retail development, including L-shaped shopping center in northwest quadrant behind Sims Bayou and Fiesta supermarket and strip centers in southeast quadrant behind Chevron service station. Northeast corner occupied by used car dealer--P.C. Motors--but southwest corner with abandoned service station available. To the south is aging middle-income Garden Villas single-family subdivision. Substantial property to the west along north side of Long Drive ideally suited for multi-family residential development. Bus routes 5, 40 and 101.
30.	Broadway & Park Place	Poor	Multiple land uses with single-family, retail, office and some industrial properties. No vacant properties of consequence.
31.	Broadway & Bellfort	Poor	Substantial existing apartment and retail development. Little or no vacant space. Apartments likely to be renovated if transit improvements constructed.

Based on these two analyses, vacant and underutilized acreage was estimated and allocated to those land uses expected to attract development. Next, estimates were made of the numbers of housing units and square footages of retail and office facilities expected to be constructed near potential sites based on typical ratios of improvements per acre for the quality and intensity of development expected in Southeast Houston. Of course, individual market studies for each project would be needed to determine the level of market support available at the time it is considered. As a footnote, it is expected that the kinds of mixed-use, high-density transit oriented development (TOD) now being projected for the Main Street Corridor connecting Downtown, Texas Medical Center and Reliant Park is not expected to occur in Southeast Houston until after 2025. Table 5-2 summarizes the results of this analysis for each of the eleven station locations considered excellent, good or fair in terms of attractiveness for future transit related development.

These capital expenditure estimates for alternative alignments in the Southeast-Universities-Hobby Corridor are small fractions of the \$9.1 billion of new development recently forecast by CDS over the 2001-2020 period for the Main Street Corridor (Downtown, Midtown and TMC-South Main), assuming "normal" development patterns. However, space demand in Southeast Houston is expected to continue to be relatively modest over the 2001-2025 period compared to the Northern, Northwestern, Western, Southwestern and Inner Loop (west of 288 and Almeda Road) sectors of the Greater Houston market. Nevertheless, the value of projected new development at station sites that may be included in a route alternative could be an important factor in the selection of a preferred alignment.

Table 5-2. Calculation of Transit Related Development Potentials Around Alternative Transit Stops - Southeast/Universities/Hobby Corridor

Transit Stop	Acreage Available and Used			Single Family		2001-2025 Development Potentials					
	Vacant	Underutilized	Total	Acres	Homes	Multi-Family		Retail		Office	
						Acres	Units ^a	Acres	SF (000s) ^b	Acres	SF (000s) ^c
Dowling & Elgin	0.71	1.32	2.03	—	—	2.03	60	0.46 ^d	20.0	—	—
Scott & OST	3.90	5.50	9.40	—	—	7.15	180	2.24	24.6	—	—
Scott & Corder	4.91	—	4.91	—	—	4.91	150	—	—	—	—
Belfort & Cullen	20.93	—	20.93	—	—	17.93	450	3.00	33.0	—	—
MLK & Griggs	11.21	5.61	16.82	—	—	13.51	340	3.31	36.4	—	—
MLK & 610	8.85	—	8.85	—	—	8.22	200	0.63	6.9	—	—
Mykawa & Dixie Drive	132.67	—	132.67	130.83	650	—	—	1.84	20.0	—	—
Wheeler & OST/So. Wayside	8.37	1.17	9.54	—	—	8.37	210	1.17	12.9	—	—
Telephone Road & Plum Creek	4.46	26.14	30.60	—	—	24.14	600	4.46	49.1	2.00	160.0
Telephone Road & Park Place/Long Drive	2.28	—	2.28	—	—	2.28	70	—	—	—	—
Telephone Road & Belfort	12.95	—	12.95	—	—	12.95	325	—	—	—	—

^a Based on 25 or 30 units/acre depending on area.

^b Based on 11,000 SF/acre.

^c Based on ground floor plate of 20,000 SF/acre.

^d Ground floor of apartment project. Mixed-use development.

6. COST ESTIMATES

6.1 Capital Costs

Capital cost estimates for each corridor study and in the assembled plan were developed using a standardized method. The capital cost estimates are based on METRO experience and supplemented with national cost when applicable. Capital cost estimating spreadsheets were developed for the following transit technologies:

- Light Rail Transit (LRT),
- Commuter Rail (CR),
- Bus Rapid Transit (BRT), and
- High Occupancy Vehicle (HOV)

Each spreadsheet defines the elements to be estimated and specifies the unit cost for each element. Quantities were then estimated for each element to develop the cost estimate. In early stages of study, quantities are more grossly defined, reflecting the level of definition of the alignments. The spreadsheets at this stage provide an order of magnitude comparison of costs and include project contingency, management, overhead, and right-of-way costs.

As greater engineering definition is available and the alignments are more specifically defined, the spreadsheets are used to provide refined capital costs. Unit costs remain constant to ensure consistency. For buses and light rail vehicles, adjustments to life cycle costs are based on current FTA guidance and METRO operating experience. Quantity estimates are refined and cost estimates are being developed using 2003 constant dollars.

In the Southeast-Universities-Hobby corridor, evaluation of technologies concluded that only Bus Rapid Transit and Light Rail Transit were viable candidates for Advanced High Capacity Transit. Consequently, capital costs were estimated for only these two technologies.

Table 6-1 through Table 6-8 provide the capital cost estimates for the corridor alternatives. The lowest cost alternative would be SL-3, due to the fact that it is significantly shorter in overall length than any of the other alternatives. The most costly would be Alternative SL-2; it is significantly longer than any other alternative, if its branch to the Texas Medical Center Transit Center is included. Without that branch, its capital cost is similar to that of Alternatives SL-1 and SL-4.

The Bus Rapid Transit alternative has been priced so that it can be easily converted to LRT should future conditions warrant. Bus Rapid Transit is shown in the estimates to be only about 70 percent as expensive as Light Rail Transit. The primary factors resulting in lower cost include the absence of an electrical supply and distribution system, and the use of lower-priced vehicles – lower even if expressed as a cost per unit of passenger capacity. Examination of cost over time would weaken that advantage, however, because buses have a shorter useful life than do light rail vehicles.

Table 6-1. Summary of LRT SL-1 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site B	Y&S Site C	End at Hinman P&R; Y&S Site B	Include Seg. W; Y&S Site B	Include Seg. Y; Y&S Site B
Vehicles	61.18	61.18	61.18	61.18	61.18
Stations	33.70	33.70	33.70	34.93	32.46
Guideway/Roadway	371.25	374.79	410.05	368.23	355.11
Maintenance/Inspection Facilities	16.89	16.89	16.89	16.89	16.89
Transit Center	7.02	7.02	7.02	7.02	7.02
Park and Ride	2.65	2.65	1.09	2.65	2.65
Road Reconstruction	72.43	72.43	72.43	61.10	51.51
Right-of-Way	17.32	14.27	17.24	17.64	17.32
Project Contingency	58.24	58.29	61.96	56.96	54.42
Total Cost (2002 Dollars)	640.69	641.22	681.57	626.60	598.57
Total Length in Miles	15.7	15.9	16.8	15.4	14.6
Cost per Mile (2002 Dollars)	40.70	40.25	40.47	40.82	40.94

Table 6-2. Summary of BRT SL-1 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site B	Y&S Site C	End at Hinman P&R; Y&S Site B	Include Seg. W; Y&S Site B	Include Seg. Y; Y&S Site B
Vehicles	35.42	35.42	35.42	35.42	35.42
Stations	37.56	37.56	37.56	38.89	36.24
Guideway/Roadway	207.62	209.32	233.19	202.76	193.66
Maintenance/Inspection Facilities	9.17	9.17	9.17	9.17	9.17
Transit Center	7.02	7.02	7.02	7.02	7.02
Park and Ride	2.65	2.65	1.09	2.65	2.65
Road Reconstruction	72.43	72.43	72.43	61.10	51.51
Right-of-Way	17.32	14.27	17.24	17.64	17.32
Project Contingency	38.92	38.78	41.31	37.46	35.30
Total Cost (2002 Dollars)	428.12	426.63	454.45	412.11	388.29
Total Length in Miles	15.7	15.9	16.8	15.4	14.6
Cost per Mile (2002 Dollars)	27.20	26.78	26.99	26.85	26.56

Table 6-3. Summary of LRT SL-2 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site A	Y&S Site A; Omit Segment H (TMC)	Y&S Site C	End at Hinman P&R; Y&S Site A	Include Seg. W; Y&S Site A	Include Seg. Y; Y&S Site A
Vehicles	70.84	54.74	70.84	70.84	141.68	141.68
Stations	36.16	28.77	36.16	36.16	37.39	34.93
Guideway/Roadway	397.08	329.79	397.08	435.89	397.95	366.26
Maintenance/Inspection Facilities	19.56	19.56	19.56	19.56	19.56	19.56
Transit Center	7.02	7.02	7.02	7.02	7.02	7.02
Park and Ride	2.57	1.56	2.57	1.01	2.57	2.57
Road Reconstruction	130.52	104.25	130.52	130.52	118.99	104.01
Right-of-Way	20.26	18.31	15.00	22.79	19.34	18.89
Project Contingency	68.40	56.40	67.88	72.38	74.45	69.49
Total Cost (2002 Dollars)	752.42	620.40	746.64	796.17	818.95	764.42
Total Length in Miles	17.1	13.7	17.1	18.2	16.8	15.4
Cost per Mile (2002 Dollars)	44.10	45.19	43.77	43.84	48.66	49.61

Table 6-4. Summary of BRT SL-2 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site A	Y&S Site A; Omit Segment H (TMC)	Y&S Site C	End at Hinman P&R; Y&S Site A	Include Seg. W; Y&S Site A	Include Seg. Y; Y&S Site A
Vehicles	35.42	29.10	35.42	35.42	111.32	111.32
Stations	38.89	32.26	38.89	38.89	40.22	37.56
Guideway/Roadway	221.07	186.26	221.07	246.65	218.21	200.51
Maintenance/Inspection Facilities	9.17	9.17	9.17	9.17	9.17	9.17
Transit Center	7.02	7.02	7.02	7.02	7.02	7.02
Parking	2.57	1.56	2.57	2.57	2.57	2.57
Road Reconstruction	130.52	104.25	130.52	130.52	118.99	104.01
Right-of-Way	18.06	16.12	15.00	20.59	19.34	18.89
Project Contingency	46.27	38.57	45.97	49.08	52.68	49.11
Total Cost (2002 Dollars)	509.01	424.31	505.64	539.92	579.52	540.16
Total Length in Miles	17.1	13.7	17.1	18.2	16.8	15.4
Cost per Mile (2002 Dollars)	29.84	30.90	29.64	29.73	34.43	35.05

Table 6-5. Summary of LRT SL-3 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site A	Y&S Site C	End at Hinman P&R; Y&S Site A
Vehicles	48.30	48.30	48.30
Stations	22.60	22.60	22.60
Guideway/Roadway	268.57	268.57	307.37
Maintenance/Inspection Facilities	13.34	13.34	13.34
Transit Center	0.00	0.00	0.00
Park and Ride	1.56	1.56	0.00
Road Reconstruction	48.50	48.50	48.50
Right-of-Way	17.19	11.93	19.72
Project Contingency	42.01	41.48	45.98
Total Cost (2002 Dollars)	462.06	456.28	505.82
Total Length in Miles	10.5	10.5	11.6
Cost per Mile (2002 Dollars)	44.09	43.54	43.68

Table 6-6. Summary of BRT SL-3 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site A	Y&S Site C	End at Hinman P&R; Y&S Site A
Vehicles	26.57	26.57	26.57
Stations	20.33	20.33	21.65
Guideway/Roadway	147.50	147.50	173.07
Maintenance/Inspection Facilities	6.88	6.88	6.88
Transit Center	0.00	0.00	0.00
Park and Ride	1.56	1.56	0.00
Road Reconstruction	48.50	48.50	48.50
Right-of-Way	17.19	11.93	19.72
Project Contingency	26.85	26.33	29.64
Total Cost (2002 Dollars)	295.37	289.59	326.02
Total Length in Miles	10.5	10.5	11.6
Cost per Mile (2002 Dollars)	28.18	27.63	28.15

Table 6-7. Summary of LRT SL-4 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site B	Y&S Site D	End at Hinman P&R; Y&S Site B	Include Seg. W; Y&S Site B	Include Seg. Y; Y&S Site B
Vehicles	45.08	45.08	45.08	45.08	45.08
Stations	23.84	23.84	23.84	25.07	22.60
Guideway/Roadway	351.49	351.49	390.30	352.35	320.67
Maintenance/Inspection Facilities	12.45	12.45	12.45	12.45	12.45
Transit Center	0.00	0.00	0.00	0.00	0.00
Park and Ride	2.81	2.81	1.25	2.81	2.81
Road Reconstruction	70.06	70.06	70.06	58.52	43.55
Right-of-Way	26.14	27.69	28.67	25.22	24.77
Project Contingency	53.19	53.34	57.16	52.15	47.19
Total Cost (2002 Dollars)	585.04	586.75	628.79	573.65	519.12
Total Length in Miles	14.2	14.2	15.3	14.0	12.5
Cost per Mile (2002 Dollars)	41.23	41.35	41.12	41.09	41.40

Table 6-8. Summary of BRT SL-4 Alternatives

Cost Category (Costs in Millions, 2002 Dollars)	Y&S Site B	Y&S Site D	End at Hinman P&R; Y&S Site B	Include Seg. W; Y&S Site B	Include Seg. Y; Y&S Site B
Vehicles	25.30	25.30	25.30	25.30	25.30
Stations	26.96	26.96	26.96	28.28	25.63
Guideway/Roadway	202.81	202.81	228.38	199.94	182.24
Maintenance/Inspection Facilities	6.55	6.55	6.55	6.55	6.55
Transit Center	0.00	0.00	0.00	0.00	0.00
Park and Ride	2.81	2.81	1.25	2.81	2.81
Road Reconstruction	70.06	70.06	70.06	58.52	43.55
Right-of-Way	26.14	27.69	28.67	25.22	24.77
Project Contingency	36.06	36.22	38.72	34.66	31.08
Total Cost (2002 Dollars)	396.68	398.38	425.88	381.29	341.93
Total Length in Miles	14.2	14.2	15.3	14.0	12.5
Cost per Mile (2002 Dollars)	27.95	28.08	27.85	27.31	27.27

6.2 Corridor Operating and Maintenance Costs

6.2.1 Methodology

O&M costs were addressed in Phase 2 of the evaluation of corridor alternatives. Since alternative-specific vehicle hours and vehicle miles, which are equilibrated to ridership, are not available in Phase 2, the O & M costs are estimated using a cost index for each high capacity transit technology under consideration. The cost indices are estimated from METRO's Fiscal Year (FY) 2001 Cost Allocation Model (for bus service) and the detailed cost build-up proposed for the Downtown to Reliant Park LRT line for FY 2005 (first full year of LRT operation).

METRO's detailed Cost Allocation Model assigns actual costs of operating and maintaining its bus facilities and services to appropriate variables. The amount of service provided divided by the allocated cost yield cost coefficients for the major service variables. When the cash flow analysis is conducted, a single service variable is used for each of the three major

components of O&M cost for METRO's bus service: scheduled hours for operations cost, scheduled miles for maintenance cost, and peak vehicles (maximum number of vehicles operated during peak periods) for general administration cost. The cost indices only include incremental line item costs for the Downtown to Reliant Park line, adjusted to account for expanding the light rail network, and comparable line items for bus service that pertain to BRT. They do not include allocated METRO overhead.

For LRT, the projected Downtown to Reliant Park line O&M costs from the draft METRO Rail Operations and Maintenance Cost Model FY03-05 are entered into METRO's FY 2001 Cost Allocation Model, and then split into five disaggregate indicators:

- Cost per scheduled vehicle (train) hours;
- Cost per scheduled vehicle (car) miles;
- Cost per peak vehicle;
- Cost per station, and
- Cost per mile of fixed guideway.

Since overhead costs would not increase at the same rate in extending the LRT system as for start-up operation, responsibility cost center are reviewed and adjustments made to reflect the differences in overhead costs. In addition, to reflect how LRT costs vary according to the number of cars in a train, three indices are prepared that account for reduced service and operation costs associated with two- car train operation. Three scenarios are possible:

- LRT with all one-car operation (LRT-1);
- LRT with about half of the service provided with two-car operation (LRT-1.5); and
- LRT with all two-car operations (LRT-2).

Since the Downtown to Reliant Park line operates with one-car trains, the costs of LRT-1 are simply the cost of the Downtown to Reliant Park line with adjustments made to reflect the decrease in O&M unit costs resulting from system extension operations versus system start-up operation. The cost of LRT-1.5 is computed by reducing vehicle hours of service and operator costs to 75 percent of LRT-1. The cost of LRT-2 is computed by reducing vehicle hours of service and operator costs to 50 percent of LRT-1.

For BRT, costs are developed as a hybrid of METRO-operated Park & Ride service and LRT costs. The cost per station and the cost per mile of fixed guideway developed for expanded LRT are also used for BRT. The cost per scheduled vehicle hours, cost per scheduled vehicle miles, and cost per peak vehicle from the FY 2001 METRO Cost Allocation Model are used to develop vehicle O&M costs, with the following adjustments:

- Allocated overhead costs that are not included in the LRT costs (such as Executive Office and Marketing) are subtracted from the bus factors;
- Park & Ride bus facility costs (public facilities maintenance) are subtracted from the bus factors;
- The bus factors are increased to adjust for the one-year difference in bus (\$FY2001) and LRT (\$FY2002) costs;
- The per-mile cost for bus is increased to adjust for the fuel and maintenance cost difference between the larger BRT vehicles and the Park & Ride buses;

- The number of revenue miles and revenue hours are 222 percent the number of revenue miles and revenue hours for the LRT-1 case to reflect the difference in passenger capacity of the vehicles (based on a maximum practical capacity of 90 for BRT vehicles and 200 for LRT vehicles); and,
- The number of vehicle miles and hours are based on the revenue miles and hours from above plus the percentage deadhead experienced on METRO's local system.

As the alternatives are carried forward into the System Plan, O&M costs are developed for the full system. The systemwide O&M costs are estimated using the cost factors from the initial evaluation plus cost factors for bus service from METRO's Cost Allocation Model and peak vehicle, revenue mile, and revenue hour outputs from the Houston METRO Long-range Patronage Forecasting Model. Productivity measures, such as O&M cost per systemwide-linked trip and O&M cost per passenger mile, are calculated for each System Plan scenario.

More detailed information regarding O&M cost estimating methodology, including the service inputs used for each technology as well as disaggregate cost indicators for METRO Rail, the three LRT future cases and BRT, is presented in the METRO Mobility Operating and Maintenance Cost Estimation Methods Working Paper dated November 2002. The conceptual results of the O&M cost estimates are presented in Table 6-9. O&M cost were not estimated separately for alternative yard and shop locations, and all assumed use of the Hinman Park & Ride Station rather than Monroe Park & Ride Station. For alternative SL-2, the light rail O&M cost was estimated without the line between the Southeast Transit Center and the Texas Medical Center Transit Center.

Table 6-9. 2025 Operating and Maintenance Costs (Light Rail)
(millions, current prices)

Alternative	6-minute headway	12-minute headway
	1-car trains	2-car trains
SL-1	\$15.8	\$14.1
SL-2 without TMC	\$13.8	\$12.3
SL-3	\$11.8	\$10.5
SL-4	\$12.3	\$11.1

7. EVALUATION OF ALTERNATIVES

7.1 Goals Attainment

The goals for transit improvement, including the introduction of AHCT in the Southeast-Universities-Hobby corridor, are documented in Chapter 1 of this report. Table 7-1 provides a summary of the goals and objectives that were developed for the analysis of alternatives in close coordination with the public

Table 7-1. Southeast-Universities Hobby Corridor Study Goals and Objectives

Goal No.	Goals	Objectives
1	Develop a multimodal Transportation system	<ul style="list-style-type: none"> • Improve transportation system accessibility and connectivity. • Reduce the time necessary to travel to and between the primary job markets and activity centers (CBD, Texas Medical Center, universities, Hobby Airport, other major centers of employment and services). • Improve transportation options for socially, economically and physically disadvantaged groups. • Reduce dependency on automobiles. • Provide an alternative to highway travel delays and congestion by means of additional transit capacity and quality.
2	Improve the efficiency, reliability, capacity and safety of existing transportation facilities	<ul style="list-style-type: none"> • Provide direct transit connection to major activity centers. • Provide area residents with enhanced transit options for a variety of trips within the corridor and region. • Provide more direct connections between the corridors of residential and commercial activities. • Provide safe, reliable and secure transit services.
3	Preserve social integrity and support of urban communities	<ul style="list-style-type: none"> • Connect high volume pedestrian activity centers. • Serve existing and future high-density residential populations. • Provide transit investment supportive of redevelopment/development and land use plans. • Minimize traffic impacts on local streets within the study area. • Minimize impacts during construction. • Minimize right-of-way requirements.
4	Plan for transportation projects that enhance the quality of the environment	<ul style="list-style-type: none"> • Improve air quality by reducing automobile emissions and pollutants. • Protect sensitive areas such as wildlife habitats, wetlands, and historic and cultural sites. • Provide a transit option to mitigate excessive parking demand and encourage a sense of place and neighborhood.
5	Define a sound funding base	<ul style="list-style-type: none"> • Provide equitable transportation services and benefits to all geographic areas and constituencies. • Provide for equitable sharing of the costs of transportation improvements among those who benefit from them. • Maximize the economic benefits gained from transit capital investments.

The evaluation material presented in this chapter demonstrates the capability of an optimal AHCT project, together with related bus service and facility improvements, to address and attain these goals. Ways in which this can be accomplished include the following:

- Goal 1: Studies completed thus far clearly demonstrate the capability of AHCT and related improvements to improve accessibility and connectivity by providing direct

linkage and notably reduced travel times between major activity centers. AHCT will be an accessible mode providing a higher level of service than presently available in the corridor. It is also clear that AHCT will be capable of attracting riders who currently use private transportation. By providing a higher level of schedule adherence than is currently possible, and a frequent, all-day bi-directional service, it will offer an attractive alternative to the congestion and uncertainties facing travel by automobile.

- Goal 2: AHCT as planned for the corridor will operate at almost twice the average speed of the existing local bus services. By operating within a reserved right of way and with traffic signal prioritization, it will encounter minimal delay and irregularity of service. Strategic location of stations will avoid too-frequent stops and provide for efficient movement between activity centers and nodes of convenient interchange with local bus services; well-located park and ride stations will meet the needs of passengers whose best option is to drive to an AHCT station. Operating efficiencies will be gained for the transit system as a whole by introducing this faster high-capacity, mode.
- Goal 3: The goal of maintaining social integrity and community support can be met through adoption of a route that balances accessibility to the corridor's population with design that respects the communities and the existing street network. Routes will be located mainly in arterial streets that can accommodate AHCT without excessive widening or adverse traffic impacts.
- Goal 4: The AHCT plan can enhance the quality of the environment by introducing a physical facility of high quality and attractive appearance in appropriate settings, and by providing an environmentally friendly service that also provides and encourages less use of transportation vehicles that are noisier or that contribute more to air pollution.
- Goal 5: AHCT will constitute a significant capital investment that contributes to the equitable supply of transportation facilities and services within the region. An appropriate project within this corridor will be part of an affordable program put forward by METRO for areawide system improvement.

7.2 Summary of Potential Environmental Impacts

The proposed route segments for each alternative alignment will result in a potential level of impact to the natural, physical, social and cultural environment as presented in Table 3-1. No alternative produces an impact that could be considered a fatal flaw or prohibitive. This evaluation determined that a similar level of cumulative environmental impact would occur for each alternative when an alignment is considered in its entirety. Therefore, an analysis of each segment may distinguish which proposed alignment(s) results in the greatest impact. The following only identifies project related impacts that can clearly differentiate an alternative from the others being proposed:

Segment 1 – East of Downtown ending at Scott/Cleburne Street

- The alignment of SL-1 is adjacent to a potential historic district along Dowling Street and Cleburne Street.
- Both SL-1 and SL-3 traverse the southwestern section of the Greater Third Ward creating a potential community disruption impact.

- Alternatives SL-1, SL-2, and SL-4 are adjacent to park areas and may result in potential noise and visual impacts. These parks include Emancipation Park (SL-1), and Peggy Miller and University Park (both SL-2 and SL-4).
- There are 242 potentially affected properties and vibration sensitive resources within 150 feet of the SL-1 centerline and 236 for SL-2.

Segment 2a – Scott/Cleburne ending at MLK/Griggs

- The SL-2 alignment is adjacent to the Riverside Terrace neighborhood, which includes historic resources.
- There are 112 potentially affected properties and vibration sensitive resources within 150 feet of the SL-2 centerline.

Segment 2b – Griggs/MLK ending at Telephone/Bellfort

- Alternative SL-2 would operate adjacent to Garden Villas, a potential historic resource.
- Alternative SL-1 is adjacent to the Alcott Elementary School and Hartman Junior High School creating a potential community disruption impact.
- There are 306 potentially affected properties and vibration sensitive resources within 150 feet of the SL-1 centerline.
- Alternatives SL-1, SL-2, and SL-3 cross Sims Bayou.
- Alternative SL-1 is adjacent to Jones Park and may result in potential noise and visual impacts.
- Alternatives SL-1 and SL-3 would require the removal of mature trees in the median of MLK to allow for project right-of-way.

Segment 3 – Telephone/Bellfort ending at Broadway/Airport (Hobby Airport)

- SL-1 and SL-3 is adjacent to multi-family residential development and the Bellfort Academy creating a potential community disruption impact.
- There are 64 potentially affected properties and vibration sensitive resources within 150 feet of the centerline for SL-1 and SL-3.
- Alternatives SL-1 and SL-2 would require the removal of mature trees in the median of Broadway and Telephone respectively to allow for project right-of-way.

Segment 2-3 – Scott/Cleburne to Hobby Airport (SL-4)

- This alternative crosses Sims Bayou and is adjacent to Garden Villas, a potential historic resource.
- There are 130 potentially affected properties and vibration sensitive resources within 150 feet of this alternatives centerline.
- A portion of the alignment is adjacent to an identified wetland area.

Segment H-M – Broadway/Airport ending at Hinman/Airport or at the Monroe Park & Ride

- The right-of-way for each alternative alignment will require the acquisition of undeveloped property that is adjacent to a palustrine emergent wetland (PEM1A) exists.

Segment R-1 – Downtown Houston

- This sector is subject to evaluation as part of the System Plan Connectivity Study

Segment R-2 – Dowling/Cleburne to Wheeler Light Rail Station

- This sector is subject to evaluation as part of the System Plan Connectivity Study

Segment R-3 – SE transit Center to Texas Medical Center (SL-2)

- This sector is subject to evaluation as part of the System Plan Connectivity Study

7.3 Summary of Potential Transportation Impacts

In this report, a preliminary assessment of transportation impacts is provided. The relevant data available at the time of writing this report included:

- Demographic data for the areas influenced by the AHCT alternatives;
- A preliminary index of AHCT demand potential;
- A preliminary indication of the potential attraction of new transit riders; and,
- A preliminary indication of the potential to generate transportation user benefits.

In addition to the positive mobility effects resulting from implementation AHCT, there are potentially both positive and negative effects on traffic and related air quality. Positive effects will result to the extent travel is diverted from private travel modes to public transportation, due to reduced vehicle miles of travel, with consequent improvement in the extent of traffic congestion and in air quality. There may also be small gains in traffic flow and air quality as a result of diversion from local bus services to AHCT, due to reduction in the number of local bus trips.

The introduction of AHCT vehicle trips will result in little or no increase in mobile source air pollutant emissions; AHCT vehicles will be either electrically powered light rail vehicles or clean-fuel bus rapid transit vehicles.

The AHCT guideway and stations will for the most part be located in city streets. There will in some cases be potentially adverse effects on traffic flow, due to changes in several factors including changes in the number of traffic lanes in some locations, reduced opportunities for left turns and for crossing traffic, and the introduction of traffic signal priority for AHCT vehicles. Such effects will be carefully evaluated as to the extent of any adverse effects, and appropriate mitigating measures will be incorporated in the design and operations planning of the AHCT system.

7.3.1 Demographic Data for the AHCT Alternatives

The transportation effectiveness of AHCT is a function of its ability to improve linkages between origins and destinations of trips that people make, or need or want to make. A complete demand analysis considers the level of service offered by an AHCT alternative in context with known or projected trip origin-destination patterns. A first level of analysis, however, is to examine the extent to which AHCT would be accessible to the resident population (the major trip origin location), and to employment, which constitutes a major trip destination.

The measures used in this evaluation are population (or households) within a half mile of AHCT stations. Numbers of households have been tabulated both for total households and for low-income households, the latter being those below the defined poverty level. One-half mile exceeds normal maximum walking distance but can be considered to be a compromise distance that reflects the fact that access to AHCT is possible not only by walking but also via bus routes or private vehicle (park and ride, kiss and ride).

The data from which these accessibility measures have been drawn are from projections for 2002 as prepared by H-GAC. In Table 7-2, various subtotals are presented as well as the totals for each of the Short-Listed Alternatives. The subtotals are used in summarizing evaluation results and in evaluating the alternative route segments within various corridor sectors.

Table 7-2. Year 2002 Employment, Population, and Households within ½ Mile of AHCT Stations

Alternative	Sector	Employment	Population	Households	Low Income Households
SL-1	1	19,714	23,398	8,118	3,809
	2a	1,796	7,338	2,546	869
	2b	3,362	17,697	6,140	1,806
	3	3,695	14,157	4,912	1,319
	Subtotal 2-3	8,853	39,192	13,598	3,995
	Other	175,776	29,556	10,255	1,517
	Total	204,343	92,146	31,971	9,320
SL-2	1	10,608	9,575	3,322	1,757
	2a	4,881	19,496	6,764	2,228
	2b	6,313	11,994	4,161	1,091
	3	6,413	7,695	2,670	673
	Subtotal 2-3	17,607	39,185	13,596	3,992
	Other	173,672	27,289	9,468	1,391
	Subtotal	201,886	76,049	26,386	7,140
	TMC Branch	60,387	10,212	3,543	662
	Total	262,273	86,261	29,929	7,802
SL-3	1	9,857	11,699	4,059	1,905
	2a	1,796	7,338	2,546	869
	2b	6,313	11,994	4,161	1,091
	3	3,695	14,157	4,912	1,319
	Other	14,670	11,847	4,111	1,411
	Total	36,331	57,035	19,789	6,595
SL-4	1	10,686	9,919	3,442	1,822
	2-3	11,283	17,401	6,037	1,666
	Other	173,210	27,265	9,460	1,352
	Total	195,180	54,585	18,939	4,840

Note: Data include Downtown and the Texas Medical Center, as applicable.

7.3.2 Transit Use (Demand Potential) Data for the AHCT Alternatives

In the opening paragraph of this section on transportation impacts, three impact characteristics are identified. These are AHCT passenger demand, new transit riders attracted, and transportation user benefits.

The first measure, AHCT passenger demand, gauges the effectiveness of an alternative on the simple basis of the number of passenger trips that may be attracted to the new service, regardless of source. Trips may be diverted from existing transit services, either because AHCT directly replaces the existing service, or because AHCT provides a more attractive option. Other trips may be diverted from other transportation modes, primarily private vehicles.

From the preliminary analyses available for the Southeast-Universities-Hobby corridor AHCT alternatives, and using Alternative SL-1 as the base for comparison (SL-1 = 100), the results are as follows:

Alternative	AHCT Demand Potential
SL-1	100
SL-2	100
SL-3	90
SL-4	75

The second measure, new transit riders, evaluates the ability of an alternative to attract passengers from private transportation. In general, alternatives that offer the largest time savings, especially to/from suitable park and ride stations, are likely to perform best. Again based on preliminary analysis, the results are as tabulated here:

Alternative	New Transit Rider Potential
SL-1	100
SL-2	115
SL-3	80
SL-4	95

The third measure, transportation user benefits, evaluates the ability of an alternative to provide measurable benefits to those who travel, whether by public or private means. Reductions in travel times are the primary measurable benefits (along with reductions in travel cost). Because an alternative may have adverse traffic impacts if it restricts traffic capacity that is needed, some of the time savings it offers transit users may be offset by delay imposed on users of private transportation. Analyses available for this report do not support any statement of definite conclusions. In general, transportation user benefits are more likely to resemble those tabulated above for new transit riders than those for AHCT passenger demand.

Alternative SL-2 includes an AHCT branch providing a connection between the Southeast Transit Center and the Texas Medical Center Transit Center. Indications are that this connection will not provide a notable improvement over existing service provided by the METRO 26 and 27 routes. It is concluded that Alternative SL-2 without the TMC connection would perform almost as well as with that connection. This of course does not preclude non-AHCT improvement of the transit service between the Southeast-Universities-Hobby corridor and the TMC.

Alternative SL-3 does not score well in comparison with Alternatives SL-1 and SL-2 primarily because it lacks direct service to Downtown, which is by far the largest single activity center

directly served by the alternatives, and the largest single concentration of destinations of trips from the corridor.

Alternative SL-4 performs well as a link to a park and ride station at its southeastern terminus, but is deficient in the amount of population it would serve.

7.3.3 Traffic Effects of the AHCT Alternatives

The intersection of Scott at Wheeler experiences the greatest increase in delay between the No Build scenario and the Light Rail scenario. For both 2007 and 2022, the intersection will operate at LOS B during No Build conditions. However, with the addition of Light Rail, the intersection deteriorates to LOS F for Light Rail alternative SL-2.

In 2007, the intersections of Griggs at MLK and Telephone at Bellfort both deteriorate from LOS C during No Build to LOS E for Light Rail alternative SL-1. These two intersections also deteriorate in 2022 under Light Rail alternative SL-1. Griggs at MLK deteriorates from LOS C during No Build to LOS F for Light Rail. The intersection of Bellfort at Telephone deteriorates from LOS D to LOS F.

Intersections operating at LOS E or LOS F are considered unacceptable during peak hours. To avoid a significant deterioration in traffic operations, Light Rail alternative SL-3 or SL-4 is preferred. If other alternatives are more desirable, additional study is needed to determine the intersection improvements needed to achieve acceptable levels of service.

7.4 Potential Economic Impacts

As explained earlier in this report, 31 possible AHCT station sites were examined in the context of development trends in the Southeast-Universities-Hobby area. The identified areas were evaluated and finally described as poor, fair, good, or excellent in their potential for transit-induced private development or redevelopment. Of the 31 sites, 11 were rated fair or better and seven of these were on the short-listed potential AHCT routes. These seven locations are tabulated in Table 7-3.

7.5 Community and Political Positions

There is at the time of writing this report a substantial body of comment by the public and stakeholders regarding the AHCT alternatives under consideration within the Southeast-Universities-Hobby study area. Public and stakeholder views vary widely with the individuals who have expressed those views. For those who stand to be most directly affected by a proposed route, opinions range from fear of community disruption or unwanted gentrification to eagerness to enjoy added mobility or to experience potential economic benefits of the project. There are, however, certain views that were repeatedly and consistently voiced; people are in favor of:

- Better east-west connections, especially to Midtown;
- Better linkage to the Texas Medical Center area;
- Faster service with fewer stops;
- More and improved transit centers and park and ride stations; and,
- Better pedestrian access to transit stops.

Table 7-3. Potential for Private Development/Redevelopment at Station Location Areas of Short-Listed AHCT Routes

No.	Potential Station Location	Private Development Grade	Comments
1	Dowling & Elgin	Fair	Several tracts/properties available for development/redevelopment. Several community facilities nearby including Emancipation Park, Ray Martin Boxing and Community Center, James Ryan Middle School and Baptist Church. Bus Route 80.
2	Scott & OST	Good	Good retail facilities, including HEB store and neighborhood shopping center, and Texas Dept. of Human Services in southwest quadrant. Peter Academy one block west on La Salette. Solid middle/ upper-middle income single-family subdivision (Riverside Terrace) north of Griggs. Middle-income neighborhood to south. Vacant and re-developable properties available. Bus Routes 5, 26, 27, 52, 60 and 87.
3	MLK & Griggs	Good	Excellent transit stop location with land available for development and re-developable properties as well. There are a number of community institutional locations on what was once the site of the Palm Center Mall, including Alice Young Branch Library, Kelsey-Seybold Clinic, Shell Youth Training Academy, Houston Community College, Houston Read Commission, Houston Urban League Business Systems Training Center, Houston Business & Technical Center and Harris County Tax Assessors office. Bus routes 5 and 77.
4	MLK & 610	Good	Significant single-family development south of 610 consisting of Southpark, Southcrest and Inwood Terrace subdivisions with fast food commercial at MLK and 610 interchange. Wellness Center on northeast corner of MKL and Beekman to north. McGregor Terrace single-family subdivision northwest of MLK and Yellowstone in northwest quadrant. Large vacant tract between 610 and RR track on northeast corner of 610 and MLK suitable for retail or multi-family. Bus routes 77 and 87.
5	Mykawa & Dixie	Good	Unattractive station site due to elevation of heavy rail freight line. However, substantial tracts available north and south of Dixie east of tracks suitable for single-family development.
6	Telephone Rd. & Park Place/ Long Drive	Fair	Houston Department of Health and Human Services is a somewhat important community destination on northeast corner. Large vacant tract east of this complex suitable for multi-family development. Otherwise, an unattractive site for development as Long Drive to the west is predominantly industrial. Bus routes 5 and 40.
7	Telephone Rd. & Belfort	Good	Active intersection with fairly substantial retail development, including L-shaped shopping center in northwest quadrant behind Sims Bayou and Fiesta supermarket and strip centers in southeast quadrant behind Chevron service station. Northeast corner occupied by used car dealer--P.C. Motors--but southwest corner with abandoned service station available. To the south is aging middle-income Garden Villas single-family subdivision. Substantial property to the west along north side of Long Drive ideally suited for multi-family residential development. Bus routes 5, 40 and 101.

Concerns that were consistently stated include:

- Pedestrian safety, especially near schools and churches;
- Equitability of transit investment;
- Minimal displacements (right of way acquisition);
- Minimal disruption during construction; and,
- Urgency of transit improvement need.

7.6 Study Findings

In this section, the study results encompassing environmental, transportation, traffic, economic development, community, and political factors affecting the AHCT route decision are summarized.

The summary material is divided into two sections. First, results are shown for the four route alternatives, SL-1 through SL-4. Second, the findings are shown by Sector, to investigate whether some different combination of route segments, not tested by the four alternatives, might produce better results than any of SL alternatives.

Finally, the initial findings and their impact on the definition of a preferred route alternative, to the extent supported by the available information are presented.

7.6.1 Findings for the Four Short-Listed Alternatives

Table 7-4 provides the assembled findings regarding Alternatives SL-1, SL-2, SL-3, and SL-4.

The above results, further summarized in Table 7-5 below, indicate no “fatal flaws” that would prevent adoption and implementation of any of the four alternatives, although some are not as free of adverse effects as others. Examples include a few locations where existing mature landscaping and trees would be affected, places where street widening may affect adjacent properties, alignment segments that traverse relatively large areas of flood plain, and locations where relatively large numbers of properties may be subjected to adverse noise and vibration (although further study will be required to determine whether there would in fact be any such effect).

Accepting this conclusion, it appears reasonable to focus on the best solution with regard to factors other than environmental, such as transportation effects and capital cost. On that basis, the following indications emerge:

- Alternatives SL-3 and SL-4 need not be further considered
- Alternative SL-2, excluding the TMC branch, appears to be somewhat better than Alternative SL-1.

One must recognize also, however, that some other un-tested combination of the route segments comprising the alternatives might prove to be better than Alternative SL-2. That possibility is considered in the next section of this report.

7.6.2 Sector-Level Findings

A total of six Sector-level investigations are reported in this section. The six are:

- Sector 1 – the area from just east of Downtown to the Universities;
- Sector 2a – the area from the Universities to Palm Center (the Griggs-Martin Luther King intersection);
- Sector 2b – Palm Center to the Bellfort-Telephone intersection;
- Sector 3 – the Bellfort-Telephone intersection to Hobby Airport;
- Sector 2-3 – (for evaluation of a major section of Alternative SL-4) – from the Universities to Hobby Airport; and,

Table 7-4. Findings Comparing the Four Short-Listed Route Alternatives

	No Build	SL-1	SL-2	SL-3	SL-4
Current Population, Households, and Employment within a half-mile of AHCT stations (thousands, H-GAC)					
Total Population	NA	92.1	86.3 (76.0 without TMC)	57.0	54.6
Total Households	NA	32.0	29.9 (26.4 without TMC)	19.8	18.9
Low Income Households	NA	9.3	7.8 (7.1 without TMC)	6.6	4.8
Employment (includes Downtown and TMC employees as applicable)	NA	204.3	262.3 (201.3 without TMC)	36.3	195.2
Travel Time – Selected Examples (minutes)					
Main (Downtown) to Hobby Airport	40	38	31	29 (at Wheeler LRT Station)	25
Main (Downtown) to Scott & Cleburne	20	12	10	7 (at Wheeler LRT Station)	10
Scott & Cleburne to Hobby Airport	35	25	22	22	15
Scott & Cleburne to Belfort (major crosstown route)	20	12 (at MLK)	16 (at Telephone)	16 (at Telephone)	9 (at Mykawa)
Preliminary Mobility Performance					
Potential Passenger Demand and User Benefit Index: SL-1 = 100	NA	100	105	80	80
Preliminary Transit Operations Statistics					
One-way route miles	NA	15.7	CBD-Hobby: 13.4, (TMC Branch: 3.1)	11.6	14.0
Number of stations	NA	21	CBD-Hobby: 17, (TMC Branch: 6)	15	13
Average revenue speed (miles per hour)	NA	22.4	CBD-Hobby: 23.0, (TMC Branch: 18.8)	21.9	28.5
Preliminary Capital Cost (\$millions)					
Light Rail	NA	682	796 (664 without TMC Branch)	506	629
Bus Rapid Transit	NA	454	540 (455 without TMC Branch)	326	426
Deduct \$43 million from Light Rail cost for terminal at new Hinman Station Park & Ride instead of Monroe Park & Ride Deduct \$31 million from Bus Rapid Transit cost for terminal at new Hinman Station Park & Ride instead of Monroe Park & Ride					

	No Build	SL-1	SL-2	SL-3	SL-4
Environmental Issues					
Non-Public Right of Way Required (Acres)	NA	33.0	CBD-Hobby 34.6, TMC Branch 0.4	32.9	50.0
Economic Revitalization Potential (Qualitative Score, 7 = best)	NA	7	7	5	2
Neighborhood Impacts	NA	Cleburne, Broadway	Scott	Cleburne	None
Noise and Vibration Sites (pre-analysis – may have no adverse effect)	NA	656	302 (including 3 on TMC Branch)	410	328
Potential Historic and Cultural Resources	NA	Dowling and Cleburne	Riverside Terrace (Scott Street)	Cleburne	None
Important tree plantings	NA	Low to significant impact	Low to significant impact	Low to significant impact	No impact
Land Use Issues, Opportunities, Constraints	NA	Good	Good	Good	Fair
<p>Note: Some evaluation categories have been omitted due to having the same and not significant effects for all alternatives, e.g., wildlife habitat, hazardous materials, and environmental justice. Other categories are omitted because they are subject to overall METRO System Plan analysis not yet performed, e.g., transportation user benefit.</p>					

Table 7-5. Summary Comparison of the Four Short-Listed Alternatives

Item	SL-1	SL-2	SL-3	SL-4
Mobility Improvement	Close second-best; directly serves largest population	Best overall because of travel time performance	Third-ranked due to necessity to transfer to go downtown	Faster than SL-3 and connects to Downtown but misses much of the population in the corridor
Cost	Moderately high cost	Highest cost for entire alternative; cost is similar to SL-1 and SL-4 cost if TMC branch is omitted	Lowest cost (shortest route)	Cost is similar to that of SL-1
Regional Connectivity	Downtown is the optimal connecting point	Downtown is the optimal connecting point; some added value if TMC branch is included	Midtown (Wheeler LRT) is useful for access to Uptown and WestPark corridors but less useful than Downtown	Connects to Downtown but does not connect as many areas of the Southeast-Universities-Hobby corridor
Ease of Implementation	Some difficulties in connection with Dowling, Cleburne, and Broadway portions of the route	Portions of Scott likely to be most difficult	Some difficulties in connection with Cleburne and Broadway portions of the route	Significant difficulties likely in working out acceptable alignment proximate to the BNSF and future SR 35
Economic Development Potential	Tied with SL-2 for highest potential	Tied with SL-1 for highest potential	About half the recognized potential of SL-1 or SL-2	Lowest potential
Community Impact	Generally favorable; some displacements or neighborhood effects	Generally favorable, fewer adverse effects than SL-1	Generally favorable, fewer adverse effects than SL-1	Fewer favorable and fewer unfavorable effects than SL-1
Environmental Impacts	Fair	Good	Better	Best

Note: Shaded cells are those that are judged to be best.

- Sector H-M – to consider terminating the line near the northeast corner of the Hobby Airport site at a new park and ride station called Hinman Station rather than continuing to the Monroe Park & Ride.

Making the best choice within each of these sectors could result in a route that is different from any of the four “SL” alternatives and might perform better than any of the four. Better performance is not a certainty, however, since there are interactions among sectors they cannot safely be selected in isolation.

The sector comparisons do not include the downtown sector, which is common to Alternatives SL-1, SL-2, and SL-4 but not part of Alternative SL-3. Sector-level capital costs do not include costs for vehicles and a maintenance facility.

7.6.2.1 Sector 1

Two route-segment combinations were short-listed within this sector. One provides a route via Dowling and Cleburne; the other provides a route via Walker and Scott. The sector is shown in Figure 7-1 and the findings for these two route options are provided in Table 7-6.

In the table, for each of the findings measures the better-ranking of the two options is shaded.



Legend



-  Short-Listed Route Segment
-  Metrolink downtown to Reliant Park line



Table 7-6. Sector 1 Findings

Sector 1	Dowling-Cleburne	Walker-Scott
Current Population, Households, and Employment within a half-mile of AHCT stations (thousands, H-GAC)		
Population	23.4	9.6
Households	8.1	3.3
Low Income Households	3.8	1.8
Employment	19.7	10.6
Preliminary Mobility Performance		
AHCT Passenger Demand Potential (preliminary)	100	80
System-wide Potential Transit User Benefit	Good	Better
Traffic directly affected by alignments	Some	Minor
Transit service orientation versus existing levels of service	Supplements or Replaces Service	Augments Coverage
Preliminary Transit Operations Statistics		
One-way route miles	2.64	2.30
Number of stations	5	3
Average station spacing (miles)	0.53	0.77
One-way running time (minutes)	8.6	6.4
Average speed (miles per hour)	18.4	21.5
Preliminary Capital Cost (\$millions, excluding vehicles and yard & shop)		
Light Rail	122.5	100.6
Bus Rapid Transit	75.2	63.7
Environmental Issues		
Non-Public Right of Way Required (Acres)	2.5	1.3
Economic Revitalization Potential	Fair	Poor
Neighborhood Impacts	Some	None
Noise and Vibration Sites (pre-analysis – may have no adverse effect)	242	149
Potential Historic and Cultural Resources	Yes	No
Important tree plantings	Some	None
Visually sensitive areas	Moderate	Minimal

7.6.2.2 Sector 2a

For this Sector, there are again two options. One extends south on Scott, turning left onto Griggs, which it follows to Martin Luther King. The other follows Wheeler to Martin Luther King, where it turns right and continues to Griggs. The sector is shown in Figure 7-2 and the findings for these two route options are provided in Table 7-7.



Table 7-7. Sector 2a Findings

Sector 2a	Wheeler-MLK	Scott-Griggs
Current Population, Households, and Employment within a half-mile of AHCT stations (thousands, H-GAC)		
Population	7.3	19.5
Households	2.5	6.8
Low Income Households	0.9	2.2
Employment	1.8	4.9
Transit Connectivity – direct service to activity centers	Universities	Universities, Relocated Southeast Transit Center
Preliminary Mobility Performance		
AHCT Passenger Demand Potential (preliminary)	100	150
New Transit Rides	Good	Better
Transit service orientation versus existing levels of service	Supplements or Replaces Service	Supplements or Replaces Service
Preliminary Transit Operations Statistics		
One-way route miles	2.28	2.58
Number of stations	3	4
Average station spacing (miles)	0.76	0.65
One-way running time (minutes)	6.7	7.6
Average speed (miles per hour)	20.4	20.4
Preliminary Capital Cost (\$millions, excluding vehicles and yard & shop)		
Light Rail	68.0	98.2
Bus Rapid Transit	40.0	62.0
Environmental Issues		
Non-Public Right of Way Required (Acres)	2.2	0.8
Economic Revitalization Potential (Qualitative Score)	Excellent	Good
Noise and Vibration Sites (pre-analysis – may have no adverse effect)	44	112
Potential Historic and Cultural Resources	None	Some
Important tree plantings	Minor	Minor

7.6.2.3 Sector 2b

For this Sector, there are also two options. One extends south on MLK, turning left onto Belfort, which it follows to Telephone. The other follows Griggs and then Long, turning right at Telephone and continuing to Belfort. The sector is shown in Figure 7-3 and the findings for these two route options are provided in Table 7-8.

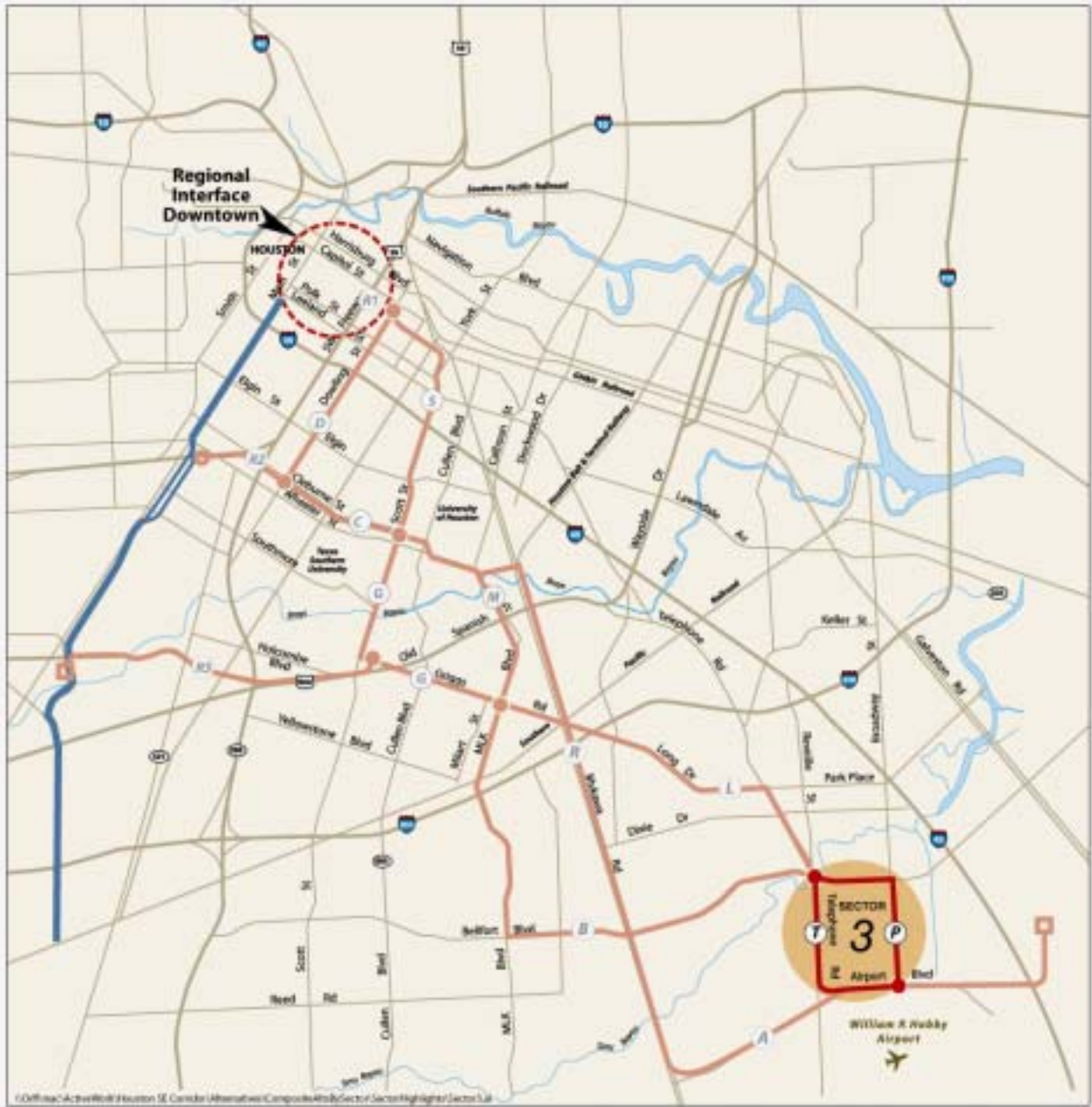


Table 7-8. Sector 2b Findings

Sector 2b	MLK-Bellfort	Griggs-Long-Telephone
Current Population, Households, and Employment within a half-mile of AHCT stations (thousands, H-GAC)		
Population	17.7	12.0
Households	6.1	4.2
Low Income Households	1.8	1.1
Employment	3.4	6.3
Transit Connectivity – direct service to activity centers	Palm Center, new MLK/Bellfort Transit Center	Palm Center
Preliminary Mobility Performance		
AHCT Passenger Demand Potential (preliminary)	100	75
System-wide Potential Transit User Benefit	Satisfactory	Better
Transit service orientation versus existing levels of service	Supplements or Replaces Service	Augments Coverage
Preliminary Transit Operations Statistics		
One-way route miles	5.62	3.64
Number of stations	5	3
Average station spacing (miles)	1.12	1.21
One-way running time (minutes)	12.6	8.7
Average speed (miles per hour)	26.7	25.1
Preliminary Capital Cost (\$millions, excluding vehicles and yard & shop)		
Light Rail	145.3	128.8
Bus Rapid Transit	86.4	88.0
Environmental Issues		
Non-Public Right of Way Required (Acres)	4.3	0.3
Economic Revitalization Potential (Qualitative Score)	Fair	Fair
Neighborhood Disruption	Some	None
Noise and Vibration Sites (pre-analysis – may have no adverse effect)	306	37
Wetlands, parklands, navigable waters, water crossings	Significant Flood Plain Crossing	Minor
Important tree plantings	Some	None
Visually sensitive areas	Some	None
Land Use Issues, Opportunities, Constraints	Positive	Acceptable

7.6.2.4 Sector 3

For this Sector, there are also two options. One extends south on Telephone, turning left onto Airport, which it follows to a station at Hobby Airport. The other follows Bellfort, turning right at Broadway and continuing to a station at Hobby Airport. The sector is shown in Figure 7-4 and the findings for these two route options are provided in Table 7-9.



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Legend

-  Short Listed Route Segment
-  Metrolink downtown to Reliant Park line



Table 7-9. Sector 3 Findings

Sector 3	Belfort-Broadway	Telephone-Airport
Current Population, Households, and Employment within a half-mile of AHCT stations (thousands, H-GAC)		
Population	14.2	7.7
Households	4.9	2.7
Low Income Households	1.3	0.7
Employment	3.7	6.4
Transit Connectivity – direct service to activity centers	Hobby Airport	Hobby Airport
Preliminary Mobility Performance		
AHCT Passenger Demand Potential (preliminary)	100	100
System-wide Potential Transit User Benefit	Satisfactory	Better
Traffic directly affected by alignments	Some	Minor
Transit service orientation versus existing levels of service	Supplements or Replaces Service	Augments Coverage
Preliminary Transit Operations Statistics		
One-way route miles	1.75	1.82
Number of stations	3	2
Average station spacing (miles)	0.58	0.91
One-way running time (minutes)	6.1	4.8
Average speed (miles per hour)	17.3	22.7
Preliminary Capital Cost (\$millions, excluding vehicles and yard & shop)		
Light Rail	60.6	53.1
Bus Rapid Transit	38.8	32.3
Environmental Issues		
Non-Public Right of Way Required (Acres)	0.4	1.5
Economic Revitalization Potential (Qualitative Score)	Poor	Poor
Neighborhood Disruption	Some	None
Noise and Vibration Sites (pre-analysis – may have no adverse effect)	64	1
Important tree plantings	Significant	None
Visually sensitive areas	Some	None
Land Use Issues, Opportunities, Constraints	Positive	Acceptable

7.6.2.5 Sector 2-3

The findings for Sectors 2a, 2b, and 3 support identification of the best route segment choice within each of those sectors. Sector 2-3 allows comparison between that best combination of segments and the corresponding routing of Alternative SL-4, which follows Wheeler to the BNSF railroad right of way, which it then follows to the southeast as far as Airport. It then turns left onto Airport, which it follows to a station at Hobby Airport.

The sector is shown in Figure 7-5 and the findings for these route options are provided in Table 7-10. The table indicates the range of findings available from the 2a, 2b, and 3 Sectors, compared with the single values found for Alternative SL-4.

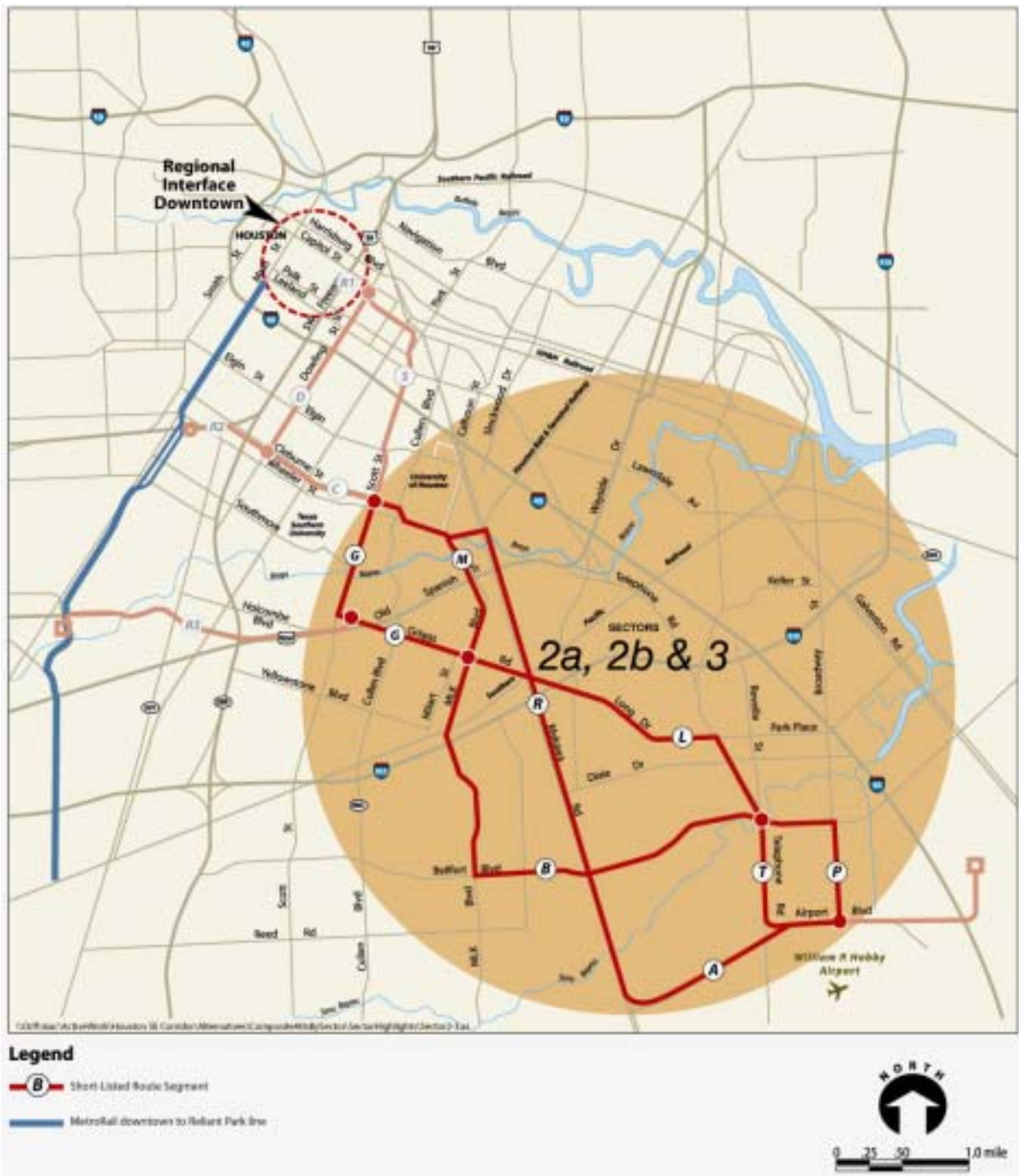


Table 7-10. Sector 2-3 Findings

Sector 2-3	Arterial Streets	Mykawa-BNSF RR
Current Population, Households, and Employment within a half-mile of AHCT stations (thousands, H-GAC)		
Population	27.0-51.4	17.4
Households	9.4-17.8	6.0
Low Income Households	2.6-5.4	1.7
Employment	8.9-17.6	11.3
Transit Connectivity – direct service to activity centers	Moderate	Minimal
Preliminary Mobility Performance		
AHCT Passenger Demand Potential (preliminary)	100	50-65
System-wide Potential Transit User Benefit	Good	Moderate
Traffic directly affected by alignments	Some	Minor
Transit service orientation versus existing levels of service	Supplements or Replaces Service	Limited Access
Preliminary Transit Operations Statistics		
One-way route miles	7.67-10.02	8.62
Number of stations	8-12	5
Average station spacing (miles)	0.96-0.84	1.72
One-way running time (minutes)	20.2-26.3	15.4
Average speed (miles per hour)	22.8	33.7
Preliminary Capital Cost (\$millions, excluding vehicles and yard & shop)		
Light Rail	249.9-304.1	266.7
Bus Rapid Transit	158.7-188.8	162.8
Environmental Issues		
Non-Public Right of Way Required (Acres)	1.5-8.0	23.6
Economic Revitalization Potential (Qualitative Score)	Excellent	Fair
Neighborhood Disruption	Some	Minor
Noise and Vibration Sites (pre-analysis – may have no adverse effect)	82-482	328
Wetlands, parklands, navigable waters, water crossings	Moderate	Some
Important tree plantings	Minor-Significant	None
Visually sensitive areas	Moderate	Some
Land Use Issues, Opportunities, Constraints	Positive	Acceptable

7.6.2.6 Sector H-M

The basic alignment planning provided for extension of the line from Hobby Airport to the Monroe Park and Ride, where it would be possible to park and board the AHCT route into the Southeast-Universities-Hobby area. As an option to this feature, a park and ride station site was found adjacent to Airport Boulevard near Hinman (just east of the Hilton Hobby Hotel). Sector H-M provides findings comparing these two route options, and is shown in Figure 7-6. The findings for these route options are provided in Table 7-11.

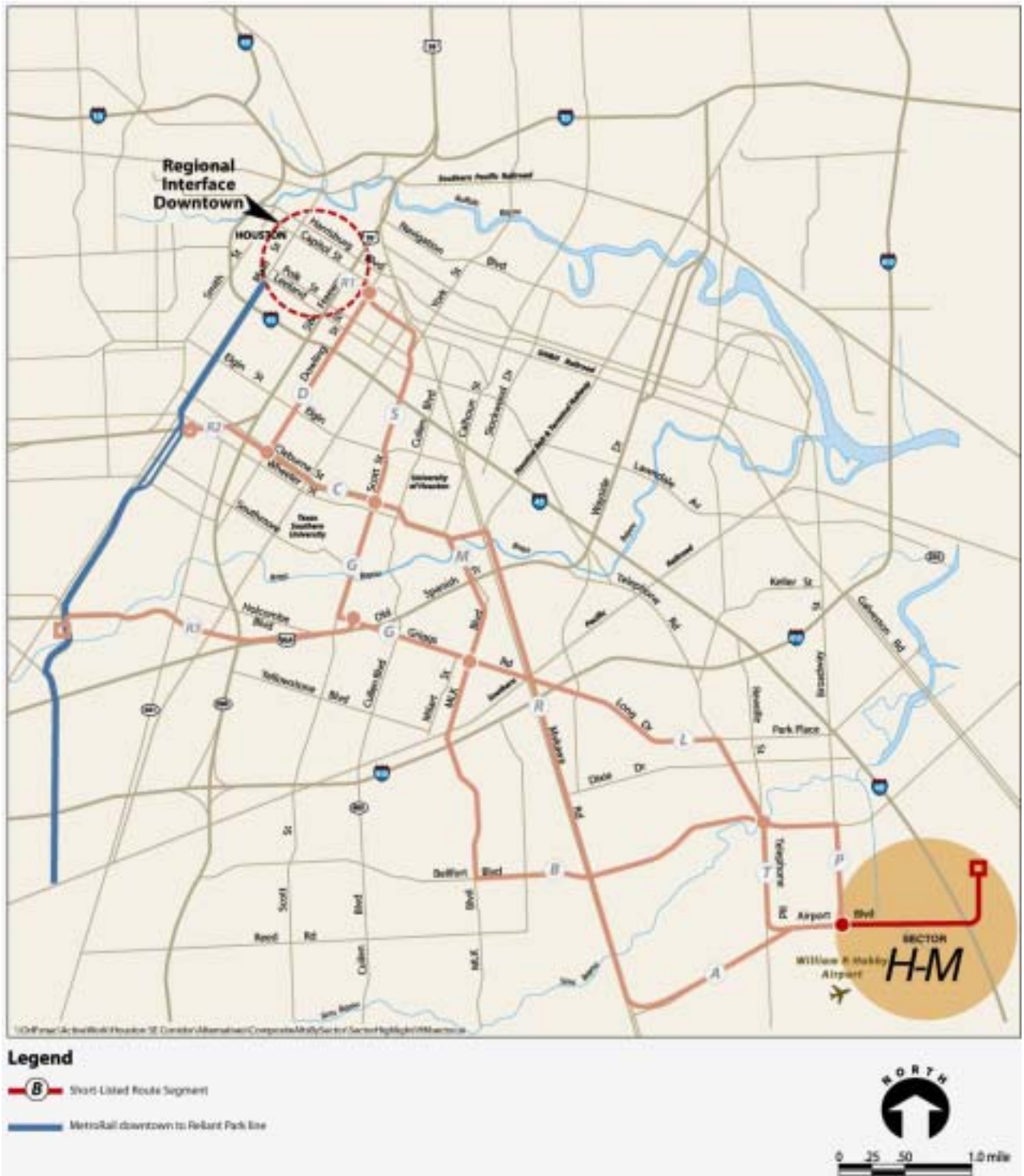


Table 7-11. Sector H-M Findings

Sector H-M	To Monroe Park & Ride	To New Hinman Park & Ride
Transit Connectivity		
Transit Connectivity – direct service to activity centers	Gulf Freeway Park & Ride	Hotel
Preliminary Mobility Performance		
AHCT Passenger Demand Potential (preliminary)	100	140
New Transit Rides	Moderate	High
System-wide Potential Transit User Benefit	Moderate	Better
Extent directly addressing low traffic level of service	Moderate	High
Preliminary Transit Operations Statistics		
One-way route miles (station-to-station)	1.78	0.65
Number of stations (including Hobby Airport)	2	2
Average station spacing (miles)	1.78	0.65
One-way running time (minutes)	2.9	1.5
Average speed (miles per hour)	36.6	26.4
Preliminary Capital Cost (\$millions, excluding vehicles and yard & shop)		
Light Rail Transit	87.2	46.3
Bus Rapid Transit	63.8	37.5
Environmental Issues		
Non-Public Right of Way Required (Acres)	7.0	7.2
Expandability	Limited	Good

7.6.3 Possible Route Segment Choices

From the above Sector-level findings, one can see that an AHCT route can be assembled from route segments selected on the basis of what appears to be best within each Sector. That route would contain the following route segments:

- * Sector 1: Dowling – Cleburne, to optimize ridership and better serve the TSU campus (but it has greater neighborhood impacts, is more expensive to build, and results in longer AHCT running time which it would impose on all passengers who travel between Downtown and the remainder of the corridor to the south of this Sector).
- * Sector 2a: Scott – Griggs, again to optimize ridership (but there is a higher capital cost, and it does not serve the University of Houston campus as well as would a line along Wheeler). It is a little longer and slower than the Wheeler-MLK option, but serves the Southeast Transit Center and provides a better connection to service between the corridor and the Texas Medical Center.
- * Sector 2b: MLK – Bellfort, also to optimize ridership (at the expense of travel time for those who traverse this link between the outer portion of the corridor and the inner corridor including the Universities and Downtown). There is also an opportunity to introduce another Transit Center (at MLK/Bellfort intersection), and this could be valuable to the corridor.
- * Sector 3: Telephone – Airport. This appears to acceptable in terms of ridership, probably because the relatively short portion of Broadway that is missed would have good feeder service to the AHCT line, and the quicker route via Airport and

Telephone would encourage use of the park and ride station to the east. Probable adverse effects on the street environment of Broadway would be avoided.

- * Sector 2-3: The BNSF route used in Alternative SL-4 appears inferior to the above options in Sectors 2a, 2b, and 3 in almost all respects.
- * Sector H-M: End the AHCT route at Hinman Park and Ride Station. This route is substantially lower in cost and appears to function better. All of the alternatives would benefit from this modification.

The route resulting from these preliminary conclusions is shown in Figure 7-7, and compared with Alternatives SL-1 and SL-2 in Table 7-12.

While the Composite Route results in the best passenger demand potential, it is also the longest, slowest and most expensive. It also includes the somewhat problematic segment along Dowling and Cleburne. SL-2 represents the best of the AHCT options analyzed and should include the enhanced bus connection to the TMC.

Table 7-12. Comparison of Sector Composite Route with Alternatives SL-1 and SL-2

Route Comparisons (draft – 3-01-03)	SL-1	SL-2 (w/o TMC)	Composite Route
Population	92.1	76.0	97.9
Households	32.0	26.4	34.0
Low Income Households	9.3	7.1	10.0
Employment	204.3	201.3	210.2
AHCT Passenger Demand Potential	Good	Better	Best
New Transit Rides	Good	Best	Better
System-wide Potential Transit User Benefit	Adequate	Better	TBD
One-way route miles	14.6	12.3	14.9
Number of stations	21	17	22
Average station spacing (miles)	0.73	0.77	0.71
One-way running time (minutes)	40	33	40
Light Rail	641	623	653
Bus Rapid Transit	428	429	430
Economic Revitalization Potential (Qualitative Score)	Excellent	Excellent	Excellent

7.6.4 Summary of Findings

From the conceptual analysis performed to obtain these initial findings some general conclusions can be reached. Alternatives SL-3 and SL-4 clearly provide a service to that provided by SL-1 or SL-2. SL-3 was designed to test an alignment that did not penetrate the downtown area and the results clearly indicate the importance of a direct connection to the CBD.

The SL-4 Alternative tested a more direct and faster connection to Hobby Airport. While the alternative is faster, it also clearly demonstrates that the market it would serve is considerably smaller than that reached by alternatives SL-1 and SL-2.

In comparing alternatives SL-1 and SL-2 (without the TMC, AHCT connection), SL-2 is stronger due to its shorter length, faster run time and lower cost. The TMC connection as an enhanced bus route can easily, and should be, included with whichever of these two alternatives ultimately selected. Based on public input, there would be resistance to the SL-1 alignment and the potential impact on a historic neighborhood along Dowling and Cleburne.

Also, it was verified that both TSU and UH preferred the SL-2 alignment, which could adequately serve the campuses from stations on Scott Street, supplemented by shuttle buses. Other Scott Street stakeholders also favored Alternative SL-2. Given these findings, SL-2 was determined to be the most promising alternative, and was carried forward into METRO system planning.

The precise location of the downtown route will be an outcome of the connectivity study currently engaged in by METRO and its GPC.

While there was not an overwhelming preference for BRT or LRT in the corridor, there is probably a slight edge in favor of LRT. The choice of technology is also influenced by the regional connections in or near the CBD. These connections affect system capacity capabilities and the needs for consistent technology among corridors that may be "through-routed".



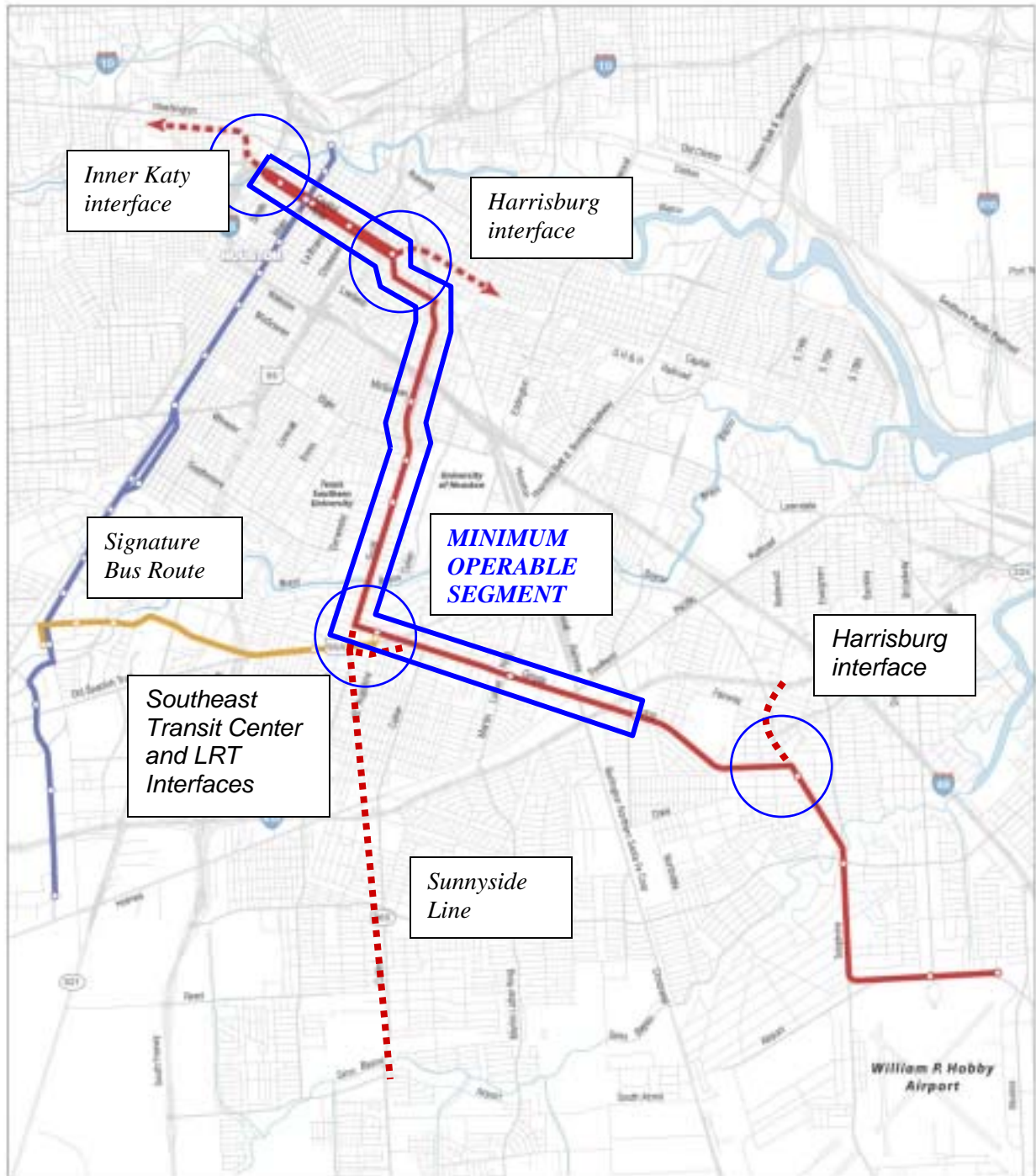
8. SYSTEM PLAN ISSUES

Subsequent to completion of an “Initial Findings” version of this report, the material described above was used in the development of an updated regional System Plan. The System Plan, known as METRO Solutions, identified a regional transit network that includes a wide array of service improvements including Advanced High Capacity Transit (AHCT) routes to be implemented through 2025. The development of the System Plan built on the framework established in the 2025 Plan, approved by the METRO Board in 2001, which called for an integrated regional transit system that combines bus service and facility improvements, with the need for AHCT in high travel demand corridors. It also incorporated the results of the AA and corridor feasibility studies carried out during 2002-2003 including this Southeast-Universities-Hobby Planning Study.

In the course of the plan development process, METRO adopted Alternative SL-2, with its TMC branch as a “Signature Service” (enhanced limited-stop bus route) as the Locally-Preferred Investment Strategy (LPIS) for this corridor, and identified three stations that could be omitted from the SL-2 route, due to low ridership potential. METRO also selected light rail as the preferred transit technology for the planned AHCT routes. Figure 8-1 illustrates the Southeast-Universities-Hobby LPIS, including a line added during system planning that will extend southward from the Southeast Transit Center to serve the Sunnyside area of the corridor.

METRO Solutions includes an implementation plan, calling for completion of 22.1 miles of light rail by 2012, and 64.8 miles by 2025, together with eight miles of commuter rail. The two highest-priority lines are Minimum Operable Segments (MOSs) of the North-Hardy Corridor and the Southeast-Universities-Hobby Corridor lines. The selected MOS for this corridor extends from Downtown Houston to the vicinity of IH 610, and is to be in service by 2009.

The METRO Solutions plan was approved by voters on November 4, 2003. An initial action of METRO following this approval is to proceed with the DEIS for the MOS in this corridor.



Source: Parsons Brinckerhoff

- LEGEND**
- Alignment alternative SL-2 with station
 - Potential system extensions
 - Metro Rail line with station
 - Signature Bus line with station



Figure 8-1. Southeast-Universities-Hobby Locally Preferred Investment Strategy

9. NEXT STEPS

Between January and March 2003, public meetings were held and information disseminated to build awareness of the System Plan and to receive comments related to System Plan development. Based on the evaluation of System Plan alternatives and the initial public response, a Draft System Plan was assembled and made available for public review in April 2003. A series of public meetings was conducted in May and June 2003 to generate public comments on the Draft Plan. Following the public meetings, comment from the general public and cooperating agencies was assessed and incorporated into the Draft System Plan, and presented to the METRO Board of Director in June 2003. The METRO Board approved the Final System Plan in July 2003, leading to a referendum approved by voters in November 2003.

A summary of the System Plan public involvement activities leading up to July Board approval is provided below.

Month	Public Involvement Activity
January	City of Houston and City of Southside Place Water Bill Survey; Focus Groups; Stakeholder Meetings; Public Meetings; Newsletter
February	Public Meetings
March	Stakeholder Briefings
April	Proposed City of Houston Water Bill Survey; Draft System Plan Available for Public Review
May/ June	Public Meetings on the Draft System Plan; Focus Groups; Newsletter
July	Final System Plan Published; METRO Board of Directors Approval

Following voter approval of the System Plan, METRO is proceeding with its implementation including preparation of the DEIS for Minimum Operable Segments of the two priority light rail corridors.

10. AGENCY AND PUBLIC INVOLVEMENT

10.1 Agency Coordination

In an effort to advance agency coordination, the study team requested input, comments and recommendations from a diverse group of working committees comprised of multi-agency representatives, technical advisors, and local area stakeholders. In this vain, METRO established a Steering Committee that included technical and project administration level staff from METRO and METRO's General Planning Consultant, the Director of H-GAC; Planning Manger, Harris County Public Infrastructure Department; Transportation and Development, TxDOT; Department, City of Houston; Mayor, City of Spring Valley; Executive Director, Harris County Toll Road Authority; Community Planner, FTA, Region VI; and, Director, Houston Airport System. The project team met periodically regarding major milestones, public involvement activities, to review citizen input, and to solicit input on direction of the study. In addition to the Steering Committee, METRO convened on a monthly basis a technical working group comprised of the project managers for the three AA studies, key staff from the General Planning Consultant, and senior staff and project manager from METRO. The focus of this group was to provide a venue for the coordination of project implementation and also provided feedback to the consultant teams on potential problems, assessments regarding alternatives, and served as a coordinating body for each of projects within the METRO Mobility System Plan.

10.2 Public Involvement

Public involvement is always an essential component of the AA process and has been an important priority of the Southeast-Universities-Hobby Planning Study. Our team was conscientious and methodical about conceiving the most optimal plan for such a unique corridor area. The public involvement team identified and pursued several critical paths for developing a tailored PI approach for the Southeast-Universities-Hobby Planning Study:

- Understanding the Depth of the Project and Alternatives;
- Understanding the Stakeholders' Issues;
- Knowing the Publics to be Served and Impacted;
- Understanding the "Real" and "Perceived" Barriers to Community Accessibility; and,
- Ability to Establish a Rapport and Maintain Reliability to Ensure Meaningful Involvement and Information Exchange.

10.2.1 Public Involvement Process

The public involvement program was developed and implemented with specific attention to national and federal guiding principles. Specifically the program was designed to be responsive to the NEPA as adopted by the FTA along with applicable laws, regulations and guidelines such as Americans with Disabilities Act (ADA). Efforts were implemented to be in compliance with public involvement requirements as prescribed by Executive Order 12898, For Federal Actions to Address Environmental Justice on Minority Populations and Low-Income Populations (3 CFR, 1994 Comp., p. 859). As part of our public involvement actions the project team:

- Disseminated information about the Southeast-Universities-Hobby Planning Study to the general public and to directly affected communities;
- Identified stakeholder groups most affected by and interested in the Southeast-Universities-Hobby Planning Study corridor development and actively sought their input;
- Encouraged adequate community understanding and maximum input through tactically planned communication forums and mechanisms; and,
- Sought to produce a locally preferred investment strategy for the Southeast corridor that was sensitive to and adequately addressed issues raised by the projects' multiple stakeholders.

The basic process followed by the study team consisted of employing successive sets of meetings at major study milestones. Initial Stakeholder meetings were used to identify representatives of the community that represented significant constituencies in the corridor. Representatives of these stakeholder groups were invited to participate on the CIC. The CIC met regularly and reviewed study progress, provided input to the development of the study milestones, review the products of the study and disseminated information to their respective groups. Stakeholder meetings have been used to continually update the public perception of the study and its products and adjust representation on the CIC.

Public meetings, formally advertised, were scheduled periodically to provide an additional opportunity to reach the public and verify that our stakeholder and CIC meetings were well focused and represented the public interest at large.

The formal workshops advertised and scheduled in the corridor presented the materials reviewed and discussed with the CIC to the larger public. These meetings provided to access the focus of the study by getting input from a broad cross section of the public.

These efforts were supplemented by an aggressive mailout of fact sheets and newsletters and an engaging corridor website. The following is a general summary of the number and types of meetings held:

3	–	Scoping Meetings
10	–	Public Meetings
48	–	Stakeholder Meetings
6	–	Workshops
6	–	CIC

(Raquelle – in sections below – we need to document general discussion/input received)

10.2.2 Public Involvement Strategies

Throughout the project, it was important to reinforce the alternatives analysis “process” and the role the public plays within that process. With this aim in mind, the project team has consistently attempted to keep the following objectives in mind when developing the public involvement strategies:

- What kind of input is being sought?
- What will be done with that input?
- When can the public anticipate a response to their input?
- What is the next step?

To facilitate a smooth and effective public outreach process, spiral, project information was developed which clearly outlined the Alternative Analysis process and clarified the role of project participants within that process. Special care was taken to initiate public involvement strategies that kept the general public informed throughout the process and assured them the team was listening and responsive to their comments. The strategies that were best suited for this type of communication were fashioned as follows:

METRO Mobility Kick-Off – The METRO Mobility Kick-Off signaled the initiation of the three AHCT corridor-planning studies: Southeast-Universities-Hobby, North Hardy, and Uptown-West Loop began simultaneously. All are an integral component of METRO's system-wide transit improvement endeavor. The METRO Mobility Kick-Off was held at METRO on December 6, 2001.

Following the METRO Mobility Kick Off, public scoping meetings were coordinated and conducted to provide a forum for information exchange between established vital stakeholders at the initial phase of the project. The study team exhibited the proposed Purpose and Need, initial alternatives for consideration, and an outline of the analysis process to be used for alternative assessment. Two public scoping meetings were held at: one at Jesse Jones High School on February 19, 2002 and the second at Texas Southern University School of Technology on February 21, 2002. In addition to the two public scoping meeting coordinated and hosted by the study team, a third agency scoping meeting was planned and coordinated by the GPC and focused on each of the three AHCT corridors. The agency scoping meeting was held at Houston-Galveston Area Council on February 25, 2002.

Public meetings were used to reach out to the general public, particularly area residents, business owners, and other stakeholders within the study area. Input and feedback from the public was encouraged specifically as it related to the elimination or advancement of potential route options. The study team also encouraged and documented the inquiries, preferences, and opinions of the community participants expressed regarding the information presented. Ten meetings were held for this phase of the project. The public meetings were held on the following dates, at the specified locations and the general materials presented were as follows:

- Jesse Jones High School - February 19, 2002
- Texas Southern University School of Technology -February 21, 2002
- HGAC -February 25, 2002
- Sunnyside Multi-Service Center - May 29, 2002
- University of Houston Hilton - May 30, 2002
- Third Ward Multi-Service Center - January 14, 2003
- Palm Center Small Business Development Training Room -January 22, 2003.
- Hilton Hobby Airport - March 6, 2003
- Palm Center Small Business Development Training Room - March 8, 2003

Working Committees were initiated in an effort to optimize community involvement from a broad blend of resources. The study team encouraged and documented input and suggestions from these groups, particularly the Community Involvement Committee (CIC). The Community Involvement Committee (CIC) was initiated by the Project team and METRO and met at regular intervals relative to major project milestones. The CIC provided feedback on the public participation activities, assisted in the development of stakeholders, and served

as a liaison to their respective constituencies. The CIC ultimately consisted of approximately 30 members made up of special interest and economic development representatives, property owners, residents, business owners, neighborhood association representatives, school district and university representatives, and other stakeholder(s) groups that were identified within the corridor throughout the study process. The CIC met prior to major milestone decision points to review and comment on the drafted purpose and need, goals and objectives, evaluation measures and conceptual alternatives. The CIC meet at 6 intervals over the course of the study. The meeting dates and general subjects discussed are as follows:

- April 30, 2002: The long list of alignment possibilities, and their screening (including input from the CIC);
- May 28, 2002: Transit-related economic development potential within the corridor; short list of route segments and their formulation into route alternatives;
- July 9, 2002: Transit technology evaluation and conclusions, update on route alternatives, discussion of evaluation methodology;
- November 19, 2002: Conceptual design of the short-listed route alternatives; and,
- February 18, 2003: Initial findings regarding the route alternatives and corridor sectors.

Individual Stakeholder meetings were held with key stakeholders from the neighborhood groups, businesses, special interest groups, and political jurisdiction to obtain input on community issues and to review alternative analysis concepts. The individuals

- Aaron Tuley, Buffalo Bayou Group
- Ada Edwards, City of Houston Councilmember
- Addie Wiseman, City of Houston Councilmember
- Adell Maxie, Business Owner – Maxie's Barber & Beauty Mall
- Diane Lipton, East End Chamber of Commerce
- Garnet Coleman, Texas State Representative
- Luther Villagomez, Houston Convention Facilities
- Mary Margaret Hansen, Greater East End Mgt. District
- Mary Vargo, Southeast Area Neighbors
- Nuria Hale, Vice President Hispanic Chamber of Commerce
- Rick Noriega, Texas State Representative
- Sylvia Garcia, City of Houston Comptroller
- Teddy McDavid, President of OST Coalition of Community Partnerships
- Reverend William A. Lawson, Wheeler Avenue Baptist Church
- Reverend J.J. Roberson, Mount Hebron Missionary Baptist Church

Stakeholder Meetings were also held with stakeholder groups within the study area. These meetings continued throughout the study process and focused on the goals and objectives of the project and also served as a information exchange vehicle. Critical information on the potential concerns, opinions, and issues of the targeted constituent groups was gathered at each meeting. The following is a sampling of stakeholders the project team met with at various points throughout the study:

- Cuney Homes Residential Council
- Downtown District
- Greater Southeast Management District
- Houston Airport System
- Houston Urban League
- Houston Visitors & Convention Center Multi-Cultural Tourism Committee
- Interfaith Ministries of Greater Houston
- M2L Associates Coordination
- Old Spanish Trail Coalition of Community Partnerships
- Olympic 2012
- Houston Baptist Ministers Association
- South Belt Ellington Chamber of Commerce
- St. Peter the Apostle School
- Texas Southern University
- Third Ward Community CLOTH
- Third Ward Redevelopment Council
- TIRZ #7
- TIRZ #15
- University of Houston
- **Super Neighborhood & Civic Associations**
 - Bayou Oaks Civic Association
 - Golfcrest/Revielle Super Neighborhood
 - LaSalette Place Civic Association
 - Lawndale Super Neighborhood
 - Minnetex Super Neighborhood
 - Manor Oaks and University Woods

- Overbrook Civic Association
- South Belt Ellington Super Neighborhood #80
- Southeast Civic Club Coalition
- Southern Village Civic Association
- Sugar Valley Civic Association
- Sunny Side Super Neighborhood
- Washington Terrace Civic Association

10.2.3 Additional Avenues for Increased Community Involvement

At pivotal stages throughout the process opportunities were provided for interested individuals to congregate and discuss the overall project and findings-to-date. Community workshops and open houses augmented the general public meetings by providing a smaller, intimate forum to focus on specific elements of the study.

As necessary and at the request of METRO, the project team initiated, conducted, and participated in additional avenues to gather information and to encourage public participation. Southeast-Universities-Hobby Planning Study information tables, booths, and comment hubs were exhibited at community events as an additional component of our team's community involvement efforts. Public involvement team members were also available to respond to inquiries and to document suggestions. Some of the specific events attended include:

- East End Chamber of Commerce Luncheon – August 15, 2002;
- Houston Bikeway Program – September 19, 2002;
- Chocolate Bayou Community Festival -- February, 2003; and,
- Rodeo and Live Stock Exhibition, March, 2003.

10.3 Communications

The public involvement program for the Southeast-Universities-Hobby Planning study process incorporated concentrated efforts in gathering information, encouraging community involvement as well as providing the public with information and education. At the same time, public involvement team sought to:

- Build on the existing community partnerships and communication networks.
- Develop, distribute and display high quality, innovative, user-friendly and community appropriate information.
- Coordinate closely with local jurisdictions, community organizations and neighborhood organizations.
- Respond in a timely manner to questions and concerns raised throughout the process.

The team designed and developed project-specific written and graphic materials developed for targeted audiences. The team designated the project newsletter *For Public Record* and

project web page Metrosoutheastplan.org as primary vehicles for public updates and feedback.

10.3.1 METRO Southeast-Universities-Hobby Planning Study Newsletter

The project team regularly produced a project study newsletter that provided study updates and initiatives. The newsletter also reflected remarks on ***The Words We Heard*** at other stakeholder meetings held throughout the corridor. Project newsletters were mass mailed to all database affiliates and placed in mass at public locations adjacent to the corridor such as community and/or senior centers, churches, recreation centers, schools, and post offices.

10.3.2 METRO Southeast-Universities-Hobby Planning Study Web Page

The project team also designed a project-specific webpage that provided project information and updates in a way that enabled users to provide written feedback and electronic mail to the public involvement staff. Via the website, users were able to see and comment on details regarding the study process, the alternatives and analysis and receive information about past and upcoming public involvement opportunities. Information on the site was updated as the study progressed to reflect changes in a current manner.

Additional efforts to maximize public involvement communications included, but were not limited to, the following:

- Informational Flyers and Handouts
- Project Fact Sheets
- Stakeholder Comment Sheets
- Stakeholder Questionnaires
- Promotional Brochures, Postcards, and Invitations
- Video Simulations
- Frequently Asked Questions Sheets
- Display Boards, Visuals, and Aerial Graphics
- Electronic Mail
- Telephone Contacts

These written and graphic materials were regularly distributed to local area residents, business owners, churches, schools, and project database participants to keep them apprised of project milestones and upcoming public involvement activities. Electronic mail and telephone contacts were executed when appropriate.

Appendix A No Build Alternative*

* Includes transit service operated by METRO, the Brazos Transit District (Woodlands Service), and TREKEXPRESS (Fort Bend County/ US 59 South)

Route Number	Description	Service Type	Headway	
			Peak	Off-Peak
001ar	Hospital Crosstown	Local	15	15
002ar	Bellaire-7600trnbk	Local	30	60
002br	Bellaire-Alief	Local	10	30
002cr	Bellaire-Westchase	Local	30	30
003ar	Langley/Southmore-Bellfort-Hk	Local	30	40
003br	Langley/Southmore-Gulf-HK	Local	30	40
004ar	Beechnut	Local	7	20
004br	Jensen	Local	7	20
005ar	Kashmere	Local	15	26
008ar	N/S.Main-Bell HK	Local	30	30
008br	N/S.Main-Willowbend HK	Local	30	30
008cr	S.Main-Bellfort TB	Local	60	60
008dr	S.Main-Willowbend TB	Local	60	60
009ar	West Gray	Local	15	30
011ar	Nance/Alameda-HK	Local	25	35
015ar	Fulton	Local	10	15
015br	HC-Southmont	Local	20	30
015cr	H.C. - Orem/TMC	Local	20	30
017ar	Tanglewood/Gulfton-HK	Local	20	25
018ar	Kirby Limited	Local	27	35
019ar	Wilcrest Crosstown	Local	15	40
020ar	Canal-Long Pt-MeC-HK	Local	25	40
020br	Canal-Long Pt-Mem/___-HK	Local	60	60
020cr	Canal-Long Pt-NeC-HK	Local	15	40
020dr	Canal-Long Point-Neu/-HK	Local	60	60
023ar	Crosstimbers Crosstown	Local	27	30
025ar	Northline Rich-W Oaks-HK	Local	12	30
025br	Northline Rich-Sharps-HK	Local	12	30
026ar	Outer Loop Crosstown	Local	15	30
026br	Outer Loop Crosstown TMCTB	Local	40	40
027ar	Inner Loop Crosstown	Local	15	30
027br	Inner Loop Crosstown TMCTB	Local	40	40
029ar	TSU/UH Hirsch Xtown	Local	18	20
030ar	Cullen/Clinton Pk-HK	Local	40	60
030br	Clinton/Galena Pk. -HK	Local	40	60
030cr	Clinton/Denver Har - HK	Local	40	50
030dr	Cullen/Clinton Pk FWY-HK	Local	60	60
030er	Clinton/Galena Pk FWY-HK	Local	60	60
030fr	Clinton/Denver Har FWY-HK	Local	60	60
033ar	Post Oak - Fuqua	Local	25	40
033br	Post Oak - Ridgemont	Local	25	40
034ar	Montrose Crosstown	Local	25	45
035ar	Leeland/Fairview -HK	Local	30	45
036ar	Lawndale-Wayside	Local	30	60
036br	Lawndale-Wayside DTT	Local	60	60

Route Number	Description	Service Type	Headway	
			Peak	Off-Peak
036cr	Lawndale	Local	40	60
037ar	El Sol Crosstown	Local	35	35
040ar	Pecore-NWM/Tel Richey-HK	Local	30	60
040br	Pecore-Ella/Tel Richey-HK	Local	30	60
040cr	Pecore-NWM/Richey GHC-HK	Local	60	60
040dr	Pecore-Ela/Richey GHC-HK	Local	60	60
040er	Pecore-Ella-Dtwn Tb	Local	60	60
041ar	Gulf Meadows Circ	Local	40	40
042ar	Holmes Crosstown Magnolia	Local	30	30
042br	Holmes Crosstown 5th Ward/De	Local	30	30
043ar	Pinemont Plaza	Local	30	55
044ar	Acres Homes	Local	20	30
044br	Acres Home via Stall	Local	40	60
045ar	Tidwell Crosstown	Local	20	40
046ar	Gessner Crosstown	Local	10	30
047ar	Hillcroft/Voss Crosstown	Local	20	25
048ar	Nav-Mag/W. Dallas-HK	Local	60	60
048br	Nav-Plv/W. Dallas-HK	Local	30	60
048cr	Nav-Pv(Lab)/W Dal-HK	Local	60	60
049ar	Chimney Rock Crosstown	Local	40	50
050ar	Harrisburg-Airport/Ht HK	Local	30	40
050br	Harrisburg-Pk Pl/Ht HK	Local	30	40
050cr	Harrisburg-LaPrt/Ht HK	Local	40	60
050dr	Harrisburg-Airp/Ht FWY HK	Local	60	60
050er	Harrisburg-PkPl/Ht FWY HK	Local	60	60
050fr	Harrisburg-LaPt/Ht FWY HK	Local	60	60
052ar	Scott-Sunysd/Hrsch-HK	Local	20	35
052br	Scott Frwy/Hirsch-HK	Local	40	40
052cr	Scott-Suny/Hrsh-FWY HK	Local	40	60
052dr	Scott-fwy/Hrsch-FWY HK	Local	60	60
052er	Scott-Downtown TB	Local	60	60
052fr	Scott-8000 TB	Local	60	60
053ar	Westheimer LTD Briar	Local	13	23
054ar	Aldine/Hollyvale	Local	30	50
056ar	Airline	Local	10	15
058ar	Hammerly	Local	20	60
058br	Hammerly via Fwy/Kty	Local	60	60
060ar	South MacGregor	Local	30	60
064ar	Lincoln City	Local	30	60
065ar	Bissonnet	Local	15	20
065br	Bissonnet via Fwy	Local	60	60
065cr	Bissonnet via Westwood P&R	Local	60	60
067ar	Dairy Ashford Crosstown	Local	30	60
068ar	Braes Bayou-West Belt	Local	24	40
068br	Braes Bayou-L610 West Belt	Local	60	60
068cr	Braes Bayou-FonMeadw	Local	24	40
068dr	Braes Bayou-Med. Ctr TB	Local	60	60
070ar	University/Memorial-HK	Local	25	60
072ar	Westview	Local	20	30
073ar	Belfort Crosstown	Local	30	40

Route Number	Description	Service Type	Headway	
			Peak	Off-Peak
073br	Belfort Crosstown TMC TB	Local	8	20
077ar	Liberty/MLK-Trswy HK	Local	24	60
077br	Liberty FWY/MLK-Twy HK	Local	24	60
077cr	Liberty/MLK-no Trswy H	Local	60	60
077dr	Liberty FW/MLK-no Twy H	Local	60	60
078ar	Irvington/Alabama-HK	Local	60	60
078br	Irvington Berry/Alabama-HK	Local	60	60
078cr	Irvington Downtown TB	Local	60	60
078dr	Irvington 9800/ Berry D-TB	Local	60	60
079ar	W. Little York Xtown	Local	35	35
080ar	Lyons-Kelley/Dowling-HK	Local	40	60
080br	Lyons-Waco/Dowling-HK	Local	60	80
080cr	Lyons-Calvacade/Dowling-HK	Local	40	60
082ar	Westheimer-West Oaks	Local	30	60
082br	Westheimer-Dairy Ash	Local	30	60
082cr	Westheimer-Woodlake	Local	10	20
083ar	Lee Road Circulator	Local	30	40
085ar	Antoine-via Freeway	Local	8	30
085br	Antoine-Washington	Local	40	60
085cr	Antoine-via Frwy/Kty	Local	40	60
086ar	FM 1960 Circ	Local	15	30
087ar	Yellowstone Circulator	Local	15	25
089ar	South Park Circulator	Local	35	60
090ar	Yale	Local	15	40
090br	Yale (8200 TB)	Local	40	40
093ar	NWTC – Greenway Shuttle	Local	20	No service
097ar	Settegast	Local	40	60
098ar	Briargate&Via N/Thum	Local	70	70
098br	Briargate	Local	35	35
101ar	Airport	Local	20	40
102ar	IAH Express AM Route	Express	60	60
102br	IAH Express-Non Hov	Express	20	40
108ar	Veterans Highway	Express	20	40
1098ar	Smith Lands-TMC Shuttle	Rail	6	No service
131ar	Memorial Exp Ges/HOV	Express	29	60
131br	Memorial Exp WB /HOV	Express	10	60
132ar	Harwin Exp-Cook Rd.	Express	30	60
132br	Harwin-Exp/Mis-Bend	Express	10	40
137ar	Northshore Exp	Express	15	40
163ar	Fondren Exp-M/City	Express	20	40
163br	Fondren Exp-Airport	Express	20	40
170ar	Missouri City Exp	Express	15	60
201ar	N. Shepherd P&R	Commuter	10	No service
202ar	Kuykendahl P&R Center	Commuter	8	No service
202br	Kuykendahl P&R Houston Ctr	Commuter	30	No service
204ar	Spring P&R	Commuter	8	No service
204br	Spring-Kuykendahl P&R	Commuter	No service	30
2051ar	CBD to Astrodome	Rail	6	6
205ar	Kingwood P&R	Commuter	10	30
205br	Kingwood-Houston Center	Commuter	30	No service

Route Number	Description	Service Type	Headway	
			Peak	Off-Peak
206ar	Eastex-P & R	Commuter	10	No service
210ar	West Belt P&R via Katy/CBD	Commuter	15	No service
212ar	Seton Lake P&R	Commuter	10	No service
212br	Seton Lake Hou Ctr P&R	Commuter	30	No service
214ar	NW Station via Katy/CBD P&R	Commuter	7	No service
216ar	WLY/Pmnt-Katy/CBD P&R	Commuter	6	No service
221ar	Kingsland P&R Katy/CBD	Commuter	5	30
228ar	Addicks P&R Katy CBD	Commuter	3	No service
228br	Addicks P&R/Sh/Co Katy	Commuter	60	No service
236ar	Maxey Rd P&R	Commuter	12	No service
244ar	Monroe P&R	Commuter	15	No service
244br	Monroe P&R via EWTC	Commuter	60	No service
246ar	Bay Area P&R	Commuter	10	No service
246br	Bay Area P&R-EWTC	Commuter	45	No service
246cr	Bay Area via NASA	Commuter	60	No service
246dr	Bay Area NASA & EWTC	Commuter	60	30
247ar	Fuqua P&R	Commuter	10	No service
247br	Fuqua P&R - EWTC	Commuter	20	No service
257ar	Townsen P&R	Commuter	15	No service
261ar	West Loop P&R	Commuter	15	No service
262ar	Alief/Westwood P&R	Commuter	10	No service
262br	Alief/Westwood P&R-Hou Ctr	Commuter	30	30
265ar	West Belfort P&R	Commuter	6	30
273ar	Gessner P&R	Commuter	12	No service
283ar	Kuykendahl/Uptown P&R	Commuter	15	30
284ar	Kingwood/Uptown P&R	Commuter	20	30
285ar	Kingsland/Addicks/Uptown	Commuter	20	No service
285br	NWTC/Greenway Plaza	Commuter	20	No service
291ar	N.Shepherd-TMC P&R	Commuter	15	No service
292ar	W.Bel/W.Wood-TMC P&R	Commuter	15	30
297ar	S. Point/Mon/TMC P&R	Commuter	15	No service
298ar	Addicks/NWTC/TMC P&R	Commuter	10	No service
313ar	Allen Parkway Special	Local	6	15
320ar	TMC Circulator White	Local	4	15
321ar	TMC Circulator Blue	Local	4	No service
443ar	T.C. Jester Ltd.	Local	20	40
451ar	Trolley Route A	Local	7	7
452ar	Trolley Route B	Local	10	10
453ar	Trolley Route C	Local	7	7
454ar	Trolley Route D	Local	8	8
455ar	Trolley Route E	Local	8	8
601ar	Sawdust P&R/CBD	Commuter	10	No service
601br	Sawdust P&R-Uptown/Greenway	Commuter	10	No service
601cr	Sawdust P&R-TMC	Commuter	10	No service
602ar	Woodlands P&R / CBD	Commuter	10	No service
602br	Woodlands P&R-Upt/Grnwly	Commuter	10	No service
602cr	Woodlands P&R-TMC	Commuter	10	No service

Note: Shaded lines identify routes that are to be implemented as part of the No Build Alternative

Source: Houston METRO Scheduling Department, 2003

Appendix B
No Build Alternative METRO Transit Capital Facilities

Corridor/Project	Limits/Location	2007 No Build	Status/Comments
Downtown to Reliant Park Corridor			
Yard & Shop		LRT	Existing
Stations (16 stations)		LRT	Existing
Fannin South	On Fannin, south of Loop 610 at Astroworld	P&R/TS	Existing
Reliant Park	On Fannin, east of Astrodome	TS	Existing
Smith Lands	On Greenbriar, between Braeswood and OST	TS	Existing
Texas Medical Center Transit Center	On Fannin, north of Galen intersection	TC/TS	Existing
Dryden/TMC	On Fannin, south of Dryden	TS	Existing
Memorial Hermann Hospital/Zoo	On Fannin, south of N. MacGregor	TS	Existing
Hermann Park/Rice University	On Fannin, south of Sunset Blvd.	TS	Existing
Museum District	Split track – on Fannin & San Jacinto, between Binz and Ewing (side platforms)	TS	Existing
Wheeler	Split track – on Fannin & San Jacinto, between Wheeler and Blodgett	TC/TS	Existing
Ensemble/Houston Community College	On Main, at Berry	TS	Existing
McGowen	On Main, at McGowen	TS	Existing
Downtown Transit Center	On Main, between St. Joseph Prkway and Pierce	TC/TS	Existing
Bell	On Main, at Bell	TS	Existing
Main Street Square	On Main, between Dallas, McKinney and Lamar	TS	Existing
Preston	On Main, at Preston	TS	Existing
U of H Downtown	On Main Street Bridge @ U of H	TS	Existing
Downtown Superstop	Travis/Lamar/Main/McKinney	TC	Existing
South Main/TMC Transit Street Recons	Major arterials in the TMC area (Fannin, Main)	TSM	Existing
Downtown/Midtown Streets	Selected Downtown and Midtown transit streets	TSM	Existing
South Main			
Missouri City Park & Ride	Beltway 8 @ Fondren	P&R	Existing
Gulf			
Gulf HOV Lane	Pierce/Dowling to Dixie Farm Road	HOV-3+/1/1	Existing
Bay Area Park & Ride	Bay Area Blvd. @ Feathercraft	P&R	Existing
Bay Area Park & Pool	I-45 and Bay Area Blvd.	P&P	Existing
Fuqua Park & Ride	Fuqua and Sabo	P&R	Existing
South Point Park & Ride	Across from the Fuqua Park & Ride	P&R	Existing, previously called Fuqua East
Monroe Park & Ride	At Gulf Freeway and Canniff	P&R	Existing
Eastwood Transit Center	Gulf Freeway @ Calhoun	TC	Existing

*Partially or totally funded and/or operated by others

Corridor/Project	Limits/Location	2007 No Build	Status/Comments
Southeast			
Southeast Transit Center	Located at OST and Scottcrest	TC	Existing
Gulfgate Transit Center	On Evergreen, just south of I-610 and Gulf Freeway	TC	Programmed
Hobby Transit Center	Airport Blvd. @ Broadway		Proposed; also includes relocation of facility to accommodate light rail operations
Eastex			
Eastex HOV Lane	Quitman to Will Clayton Parkway	HOV-3+/1/1	Existing
Eastex HOV Lane*	Will Clayton Parkway to Kingwood	HOV-3+/1/1	Under construction
Eastex HOV Lane	Jackson/Chenevert to Quitman	HOV-3+/1/1	Under construction
Eastex Park & Ride w/HOV ramp	Aldine Bender and Old Humble Road	P&R	Existing
Kingwood Park & Ride	Just north of Kingwood Dr. on Lake Houston Parkway	P&R	Existing
Tidwell Transit Center	US 59 (Eastex) @ Tidwell	TC	Existing
Townsen Park & Ride	West of Eastex Frwy @ Townsen Blvd.	P&R	Existing
Kashmere Transit Center	Kelley Rd. @ Hirsch	TC	Existing
I-10 East			
Maxey Road Park & Ride	Maxey Road and Federal Road	P&R	Existing
Fifth Ward/Denver Harbor Transit Center	Lockwood between Lyons Ave and Farmers St	TC	Existing
Katy			
Katy HOV	SH6 to Inner Katy Connector	HOV-3+/1/1	Existing
Katy Diamond Lanes*	Between Barker-Cypress/Hwy. 6 to Grand Parkway	HOV-3+/2/2	Existing
Katy/CBD HOV Ramp to Downtown	Direct ramp to north side of CBD at Franklin	HOV-3+/3/2	Existing
Kingsland Park & Ride	On Kingsland Blvd., just east of Town & Country	P&R	Existing
Addicks Park & Ride	Just north of I-10, between SH 6 and Eldridge	P&R	Existing
Katy/West Belt Park & Ride	On West Belt, north of I-10	P&R	Existing
Northwest Transit Center	Old Katy Rd. @ I-10 West	TC w/park	Existing
North/Hardy HOV			
North HOV Lane	Smith/Louisiana to north of FM 1960	HOV-3+/1/1	Existing
North HOV Lane Crosstimbers Ramp	Direct access ramp from Northline TC	HOV/ramp	Existing
North HOV Lane Connection "L"	Direct ramp connection	HOV-3+/1/1	Existing
Kuykendahl Park & Ride	I-45 @ Kuykendahl and DeMontrond	P&R	Existing
North Shepherd Park & Ride	North Shepherd @ Little York	P&R	Existing
Spring Park & Ride	FM 1960 @ Carlsway	P&R	Existing
Northline Mall Transit Center	Northline Mall	TC	Existing
Greenspoint Dr./Greenspoint Mall Transit Center	Greenspoint Dr./Greenspoint Mall	TC	Existing

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Corridor/Project	Limits/Location	2007 No Build	Status/Comments
Northwest			
Northwest HOV Lane	Northwest Transit Center to FM 1960	HOV-3+/1/1	Existing
Northwest Transit Center	I-10 (Katy Frwy) @ I-610 (West Loop)	TC w/park	Existing
Pinemont Park & Ride	Pinemont @ Bingle	P&R	Existing
West Little York Park & Ride	West Little York, between West Belt & US 290	P&R	Existing
Northwest Station P&R	Northwest Frwy (US 290) @ West Rd.	P&R	Existing
Barker Cypress Park & Ride	US 290 @ Skinner	P&R	Programmed
Uptown-West Loop			
Richmond Transit Center	In the median on Richmond, between Post Oak & Rice; relocate to S. Rice with LRT	TC	Programmed
West Loop Improvements	Portals at Westpark/US 59 and Post Oak Blvd.	TSM	Programmed
SH 249/Tomball Corridor			
Seton Lake Park & Ride	Seton Lake @ Bammel North Houston	P&R	Existing
Acres Home Transit Center	West Little York, just west of SH 249	TC	Existing
South Loop			
West Loop Park & Ride	Intersection of West Loop 610/South Loop 610	P&R	Existing
Southwest			
Southwest HOV Lane	Shepherd to County Line	HOV-3+/1/1	Existing
Southwest HOV Lane*	South of Elgin to Shepherd	HOV-3+/1/1	Under construction
Hillcroft Transit Center	On Westpark between US59 and Hillcroft	TC	Existing
Westwood Park & Ride	Southwest Freeway @ Bissonnet	P&R	Existing
Alief Park & Ride	Boone Rd. and Bissonnet	P&R	Existing
West Bellfort Park & Ride	Southwest Freeway @ West Bellfort	P&R	Existing
Westpark			
Mission Bend Park & Ride	Alief-Clodine and Eldridge Pkwy	P&R	Existing
Westchase Park & Ride	Northwest corner of Rogersdale and Harwin	P&R	Under construction
Westpark Toll Lanes*	IH-610 to Beltway 8	HOV-3+/2/2	Under construction
Gessner Park & Ride	Westpark and Gessner	P&R	Existing
Harrisburg/SH 225 Corridor			
Magnolia Transit Center	East of M. Garcia between Harrisburg and Capitol	TC	Existing
Non-Corridor Facilities			
Bellaire Transit Center	On Bellaire between Bissonnet and S. Rice Ave.	TC	Existing
Heights Transit Center	N. Main/W. 20th, and Studewood	TC	Existing
Hiram Clarke Transit Center	Buffalo Speedway @ Fuqua	TC	Existing
Mesa Transit Center	Mesa @ Tidwell	TC	Existing
Facilities Operated By Other Entities*			
Brazos Transit District - The Woodlands Express			
Research Forest Park & Ride	3900 Marisco Place in The Woodlands	P&R	Existing
Sawdust Park & Ride	701 West Ridge in Spring, Tx	P&R	Existing

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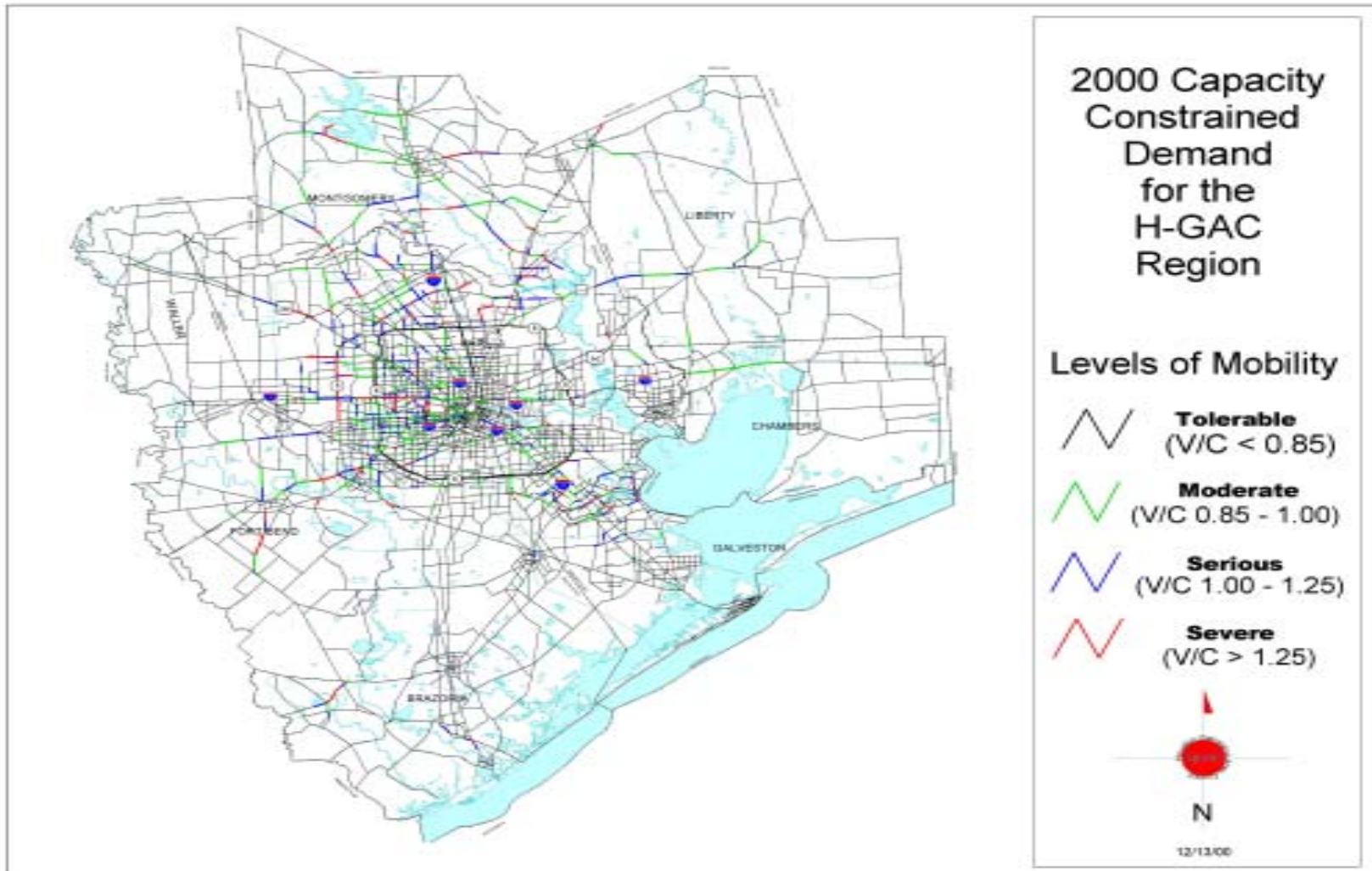
Corridor/Project	Limits/Location	2007 No Build	Status/Comments
TREKEXPRESS			
University of Houston Park & Ride	University Blvd. & US 59 South, Sugar Land, Tx	P&R	Existing
First Colony AMC Theatre Park & Ride	AMC Theatre lot, Sweetwater Blvd. @ US 59 South, Sugarland, Tx	P&R	Existing
NOTE: (1) a grouping of low cost project improvements; (2) AHCT = Advanced High Capacity Transit; (3) HOV designations = # people in carpool/ # of lanes/ # of directions of HOV operation; (4) LRT = Light Rail Transit; (5) SIP = Service Improvements Package (6) CRT = Commuter Rail Transit			

- LRT** Light Rail Transit
- TS** Transit Station
- TC** Transit Center
- TSM** Transportation System Management
- P&R** Park & Ride
- HOV** High Occupancy Vehicle

Source: Houston METRO Capital Planning, 2003

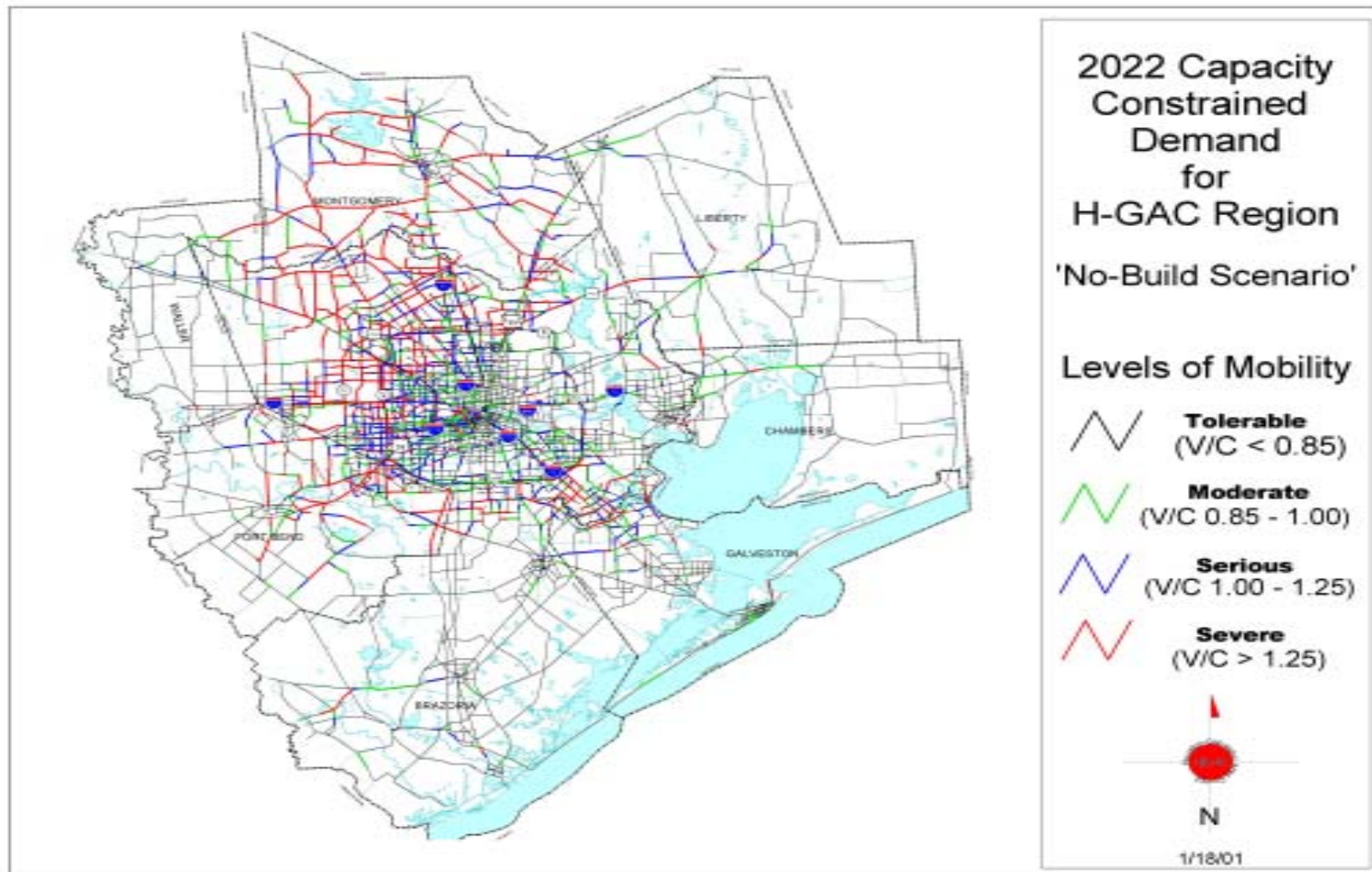
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Appendix C
 Current and Future Regional Levels of Mobility
FIGURE C-1 Current Levels of Mobility (2000)



Source: HGAC Transportation Department 12-13-00

FIGURE C-2 2022 No Build Scenario (Future Demand on Current Roadways)



Source: HGAC Transportation Department 1-18-01

Appendix D
Future Harris County Toll Road Projects

Project	Limits		Distance	Est. Cost	Facility
	From	To	In miles	In \$ millions	
Ft. Bend Parkway	Beltway 8 W @ Hillcroft	Grand Parkway South of SH 6	18.7	Phase 1 49.	4 lanes
Ft. Bend Westpark	FM 1464	Grand Parkway	6	41.5	4 lanes
Westpark Toll Road	I-610 W	FM 1464	16	391	4 lanes
Post Oak Rd Extension	I-610 S	Beltway 8 S @ Hillcroft	5	55	4 lanes
I-10 W Toll Lanes	I-610 W	City of Katy	20	266	4 high occupancy toll lanes
Northwest Tollway	I-610 N	Grand Parkway	20	-	4 lanes using railroad ROW
Grand Parkway Tollway NW	I-10 W	US 59 N	53	487	4 lanes
Grand Parkway Tollway East	I-10 E	US 59 N			
Grand Parkway Tollway S	US 59 S	Fred Hartman Bridge SH 146			
SH 87 Toll Bridge	Galveston	Bolivar Peninsula		211	
Kingsland Blvd	SH 6	Barker Cypress	3.5		4 lanes
Barker Cypress	Westpark Tollway	I-10 W	5		4 lanes
Briar Forest	SH 6	W of Barker Reservoir	5		4 lanes
Beltway 8 East Tollway	US 59 N	US 90 E			
US 290 Toll Lanes	I-610	Grand Parkway			
SPRR Corridor	I-610 N	I-610 S			
SH 35 S	Old Spanish Trail	Grand Parkway			
Fairmont Pkwy E	Beltway 8 E	Grand Parkway			
SH 288 S	US 59 S	Grand Parkway			

Source: Compiled by West Houston Association from material supplied by the Harris County Toll Road Authority.



Parsons Brinckerhoff Quade & Douglas, Inc.

11757 Katy Freeway
Suites 600
Houston, TX 77079
281.496.5590



METROMOBILITY

